The Sizewell C Project

6.18 Fourth Environmental Statement Addendum
Volume 1: Main Text

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None provided.

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None provided.

1 INTRODUCTION AND SCOPE OF THE FOURTH ENVIRONMENTAL STATEMENT ADDENDUM

1.1 Introduction

a) Background

1.1.1 NNB Generation Company (SZC) Limited ('SZC Co.') submitted an application for a Development Consent Order (DCO) to the Planning Inspectorate under the Planning Act 2008 for the Sizewell C Project in May 2020 (referred to as the 'Application'). The Application was accompanied by an **Environmental Statement ('ES'**) [APP-159 to APP-582].

1.1.2 SZC Co. submitted a request to change the Application in January 2021, with 15 changes proposed across the proposed development. This request was accompanied by an addendum to the ES, referred to as the '**First ES Addendum**' [AS-179 to AS-292]. These 15 changes were accepted for examination by the Examining Authority in April 2021 (referred to as the 'Accepted Changes (April 2021)').

1.1.3 The **First ES Addendum** also considered any 'Additional Information' submitted by SZC Co. during the pre-examination stage. The 'Additional Information' has been provided to support the Application and assist Interested Parties in their understanding of matters.

1.1.4 As a result of the ongoing engagement between SZC Co. and stakeholders, including as part of the process of agreeing common ground and ongoing design development, SZC Co. subsequently identified three further proposed changes ('Proposed Changes 16 to 18'). These changes were accepted for examination by the Examining Authority in August 2021 (referred to as the 'Accepted Changes (August 2021)'). The change request was accompanied by a '**Second ES Addendum**' [REP5-062 to REP5-069].

1.1.5 At Deadline 6, SZC Co. submitted a **Third ES Addendum** [REP6-017] to present corrections to road traffic noise modelling for road links associated with the two village bypass, Sizewell link road, Yoxford roundabout and other highway improvements, and an assessment of any new or different significant effects that are likely to result from these corrections.

b) Purpose of the Fourth ES Addendum

1.1.6 This document is a fourth addendum to the ES for the Sizewell C Project (hereafter referred to as the '**Fourth ES Addendum**'). The purpose of this

Fourth ES Addendum is to present an assessment of any new or different significant effects that are likely to result from:

- any Additional Information that has been submitted by SZC Co. over the course of the examination; and
- a further proposed change to the Application to provide for a temporary desalination plant at the main development site (referred to as 'Proposed Change 19').

1.1.7 A full list of Additional Information submitted over the course of the examination to date, as relevant to each EIA topic, and an assessment of whether such information results in any new or different significant effects is provided within **Volume 1, Chapter 2** of this **Fourth ES Addendum**.

1.1.8 The Proposed Change 19 follows further engagement and design work in collaboration with Northumbrian Water Limited, which has identified the need for a change to the construction water supply strategy for the Sizewell C Project, specifically the provision of a temporary desalination plant at the main development site.

1.1.9 SZC Co. carried out non-statutory consultation between 3 August 2021 and 27 August 2021 on the Proposed Change 19 and has taken into account consultation feedback in finalising the change. An assessment of the Proposed Change 19 is provided within **Volume 1, Chapter 3** of the **Fourth ES Addendum.**

1.2 Scope and methodology of the Fourth ES Addendum

a) Overview

1.2.1 This section outlines the scope and methodology used in this **Fourth ES Addendum**. This **Fourth ES Addendum** should be read in conjunction with the ES submitted with the Application in May 2020 [APP-159 to APP-582], as updated by the subsequent **ES Addenda** [AS-179 to AS-292], [REP5-062 to REP5-069], [REP6-017].

1.2.2 Throughout this **Fourth ES Addendum**, references are given to the examination library numbers assigned by the Examining Authority (identified within square brackets, e.g. [APP-159]) for information previously issued to the Examining Authority or SZC Co. document numbers ('Doc Ref.' numbers) for documents which have yet to be assigned an examination library number.

1.2.3 A glossary of terms and list of abbreviations used in this **Fourth ES Addendum** is provided within **Book 1** [AS-106].

1.2.4 The general assessment methodology and topic-specific methodologies, relevant legislation, policy and guidance, key assumptions and limitations set out in **Volume 1, Chapter 6** of the **ES** submitted with the Application [APP-171 and APP-177] remain unchanged, unless specifically stated. This is to ensure there is consistency between the **ES** and the subsequent addenda.

b) Scope and methodology for the assessment of Additional Information and Proposed Change 19

1.2.5 Prior to considering changes to environmental effects as a result of the Additional Information and Proposed Change 19, a screening exercise was undertaken. This comprised a review of the Additional Information and Proposed Change 19 by EIA specialists across all technical assessments presented in the **ES** [APP-159 to APP-582], as updated by the **ES Addenda** [AS-179 to AS-292], [REP5-062 to REP5-069], [REP6-017]. The review was used to determine whether the Additional Information or Proposed Change 19 had the potential to result in any new or different significant environmental effects compared to those reported in the **ES**.

1.2.6 The outcome of this screening exercise is provided in **Table 1.1.** The updated assessments have been provided within **Volume 1, Chapters 2** and **3** of this **Fourth ES Addendum**.

Table 1.1: Sizewell C Project ES assessments updated due to Additional Information and / or Proposed Change 19

Fourth ES Addendum Chapter	Sizewell C Project ES Updated Assessments
Chapter 2: Additional Information	• Transport • Noise and vibration • Terrestrial ecology and ornithology • Cumulative effects
Chapter 3: Proposed Change 19	• Conventional waste and material resources • Noise and vibration • Air quality • Coastal geomorphology and hydrodynamics • Marine water quality and sediments • Marine ecology and fisheries • Marine historic environment • Marine navigation • Major accidents and disasters • Cumulative effects

1.3 General assumptions and limitations

1.3.1 Where relevant for each environmental topic, key assumptions and limitations for undertaking the assessment have been explained and their consequences on the completeness or potential accuracy of the conclusions have been identified. In general, these remain as set out in **Volume 1, Chapter 6** of the **ES** submitted with the Application [APP-171 and APP-177], unless otherwise updated in the **ES Addenda** [AS-179 to AS-292], [REP5-062 to REP5-069], [REP6-017] or stated within the subsequent chapters of this **Fourth ES Addendum**.

1.4 Structure of this Fourth ES Addendum

1.4.1 This **Fourth ES Addendum** comprises three volumes.

1.4.2 The remainder of this volume (**Volume 1**) is structured as follows:

- **Chapter 2 – Additional Information** – presents a list of Additional Information submitted over the course of the examination by SZC Co. relevant to the ES and updated assessments, where required; and
- **Chapter 3 – Proposed Change 19** – presents an environmental assessment of the proposed temporary desalination plant.

1.4.3 **Volume 2** of this **Fourth ES Addendum** provides the relevant figures corresponding to the chapters set out in this volume.

1.4.4 **Volume 3** of this **Fourth ES Addendum** provides the relevant appendices corresponding to the chapters set out in this volume.

1.4.5 This **Fourth ES Addendum** is also accompanied by a **non-technical summary** (**NTS**) which provides a summary of the key findings from this volume of the **Fourth ES Addendum** in non-technical language. The **Fourth ES Addendum NTS** provides an update to the NTS submitted with the Application [APP-159], as updated by the subsequent **ES Addenda** [AS-179], [REP5-062], [REP6-017].

VOLUME 1, CHAPTER 2: ADDITIONAL INFORMATION

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PLATES

None provided.

FIGURES

None provided.

APPENDICES

2 ADDITIONAL INFORMATION

2.1 Introduction

2.1.1 This chapter of the **Fourth ES Addendum** presents a summary of the Additional Information issued by SZC Co. since the start of Examination of the Sizewell C Project that is relevant to the environmental assessments presented within the **ES** [APP-159 to APP-582], as updated by the subsequent **ES Addenda** [AS-179 to AS-292], [REP5-062 to REP5-069], [REP6-017]. It then considers whether the Additional Information updates the **ES** and the subsequent **ES Addenda** in terms of the reported effects, mitigation, residual effects and their significance.

2.1.2 The conclusion of this review is captured in tables for each topic section of this chapter, under 'Updates to the ES conclusions required?' column. Where it is concluded that updates are required, an updated assessment has been provided.

2.2 Descriptions of Development

2.2.1 **Table 2.1** sets out updates made to the Description of Development chapters of the **ES** over the course of the Examination. The updates made either comprise corrections to the descriptions of development or include updates for Changes 16-18 which were accepted by the Examining Authority into the Examination on 10 August 2021 and were assessed within the **Second ES Addendum** [REP5-062 to REP5-069]. Therefore, no further updates to the ES are required as a result of these changes and these changes do not alter the conclusions of the **ES**, as updated by the subsequent **ES Addenda**.

Table 2.1: Updates to the Description of Development Chapters of the ES

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Volume 2, Chapter 2 Description of Permanent Development [REP2-036] [REP5-061] (refer to **Volume 3, Appendix 2.A** of this **Fourth ES Addendum** for the Deadline 7 version)	2, 5, 7	At Deadline 2, the updates included corrections to the minimum stack height parameters of emergency diesel generators on the main platform to match the heights assessed within **Volume 2, Chapter 12** (Air Quality) of the **ES** [APP-212]; updates with regards to the permanent width of the SSSI crossing bridge structure; coastal defences, removal of the emergency equipment store and permanent back up generator from Upper Abbey Farm (parameter zone 1M) and the relocation of the emergency equipment store to zone 1A on the main platform; clarification of the works proposed for Leiston off-site sports facilities and other minor changes to wording to provide clarifications or corrections in response to the first round of written	No further assessment of the updates within Description of Permanent Development made at Deadlines 2 and 7 is required, as the corrections do not change the worst-case assumptions used within the technical assessments of the ES. The removal of the emergency equipment store and back up generator from Upper Abbey Farm removed a parameter zone. However, the relocation of the emergency equipment store to zone 1A did not change the parameters assessed for this zone. Updates made to the Description of Permanent Development as a result of Change 16 were assessed within **Volume 1, Chapter 2** of the **Second**	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
		questions from the Examining Authority. At Deadline 5, the updates included amendments made as a result of Change 16. At Deadline 7, minor clarifications to text have been made. In addition, the minimum crest height of the SSSI crossing has been increased to 8.6m, as set out within **Deadline 5 Responses from Earlier Deadlines, Appendix J** [REP5-120].	**ES Addendum** [REP5-064]. Therefore, no further assessment is required.	
Volume 2, Chapter 3 Description of Construction [REP2-036] [REP3-014] [REP5-047]	2, 3, 5	At Deadline 2, minor clarifications and corrections were made with regards to the description of the construction of the SSSI crossing, coastal defences and permanent beach landing facility, the provision of a southern earth bund during the early stages of construction, the removal of the fifth arm of the main site access roundabout and Leiston off-site sports facilities at the end of construction. The maximum	No further assessment of the updates within Description of Construction at Deadline 2 and Deadline 3 is required, as the corrections do not change the worst-case assumptions used within the technical assessments of the ES.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
		parameters of caravans at LEEIE were specified and temporary car parking numbers at the main development site during construction were set out. At Deadline 3, the chapter was updated to separate out Appendix 3D Construction Method Statement information from the chapter. At Deadline 5, the updates included amendments made as a result of Change 16.	Updates made to the Description of Construction as a result of Change 16 were assessed within **Volume 1, Chapter 2** of the **Second ES Addendum** [REP5-064]. Therefore, no further assessment is required.	
First Environmental Statement Addendum Volume 2, Chapter 7 Figures Yoxford Roundabout Masterplan [REP2-039]	2	Figure 2.1 was updated to correct an error. It was previously incorrectly not showing an existing highway to the south of the new roundabout as being converted to use by non-motorised users.	No further assessment is required, as the corrections do not change the worst-case assumptions used within the technical assessments of the ES.	No
Updated Main Development Site Environmental Statement and Environmental Statement	2, 5	At Deadline 2, the following figures were updated to reflect the minor updates made to the Description of Permanent and Description of Construction chapters of the ES:	No further assessment is required, as the corrections do not change the worst-case assumptions used within the technical assessments of the ES,	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Addendum Figures [REP2-038] [REP5-057]		• ES Chapter 2 Figure 2.3 – Operational Parameters, Key Plan; • ES Chapter 2 Figure 2.5 – Operation Parameters, Upper Abbey Farm and Surround Area; • ES Chapter 2 Figure 2.12 – Leiston On Site Sports Facilities; and • ES Addendum Chapter 2 Figure 2.2.2 – Construction Parameters Plan. At Deadline 5, the document was re-issued to correct a compression issue and to include an updated Figure 2.11 SSSI Crossing Illustrative View.	as discussed above for **Volume 2, Chapters 2** and **3** of the **ES**.	
Volume 2 Main Development Site Chapter 3 Description of Construction - Appendix 3D: Construction Method Statement [REP3-	3, 5, 7	At Deadline 3, Appendix 3D Construction Method Statement information was separated out from Volume 2, Chapter 3 Description of Construction.	The creation of Appendix 3D at Deadline 3 did not change the description of construction, as such no further assessment is required.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
015] [REP5-048] (Doc Ref. 6.3 3D(B))		At Deadline 5, Appendix 3D was updated to take into account Change 16. At Deadline 7, minor corrections have been made with regard to the number of terrestrial piles required for the permanent beach landing facility. Furthermore, a separate version of Appendix 3D has been prepared for the change submission of the temporary desalination plant at main development site.	Updates made to Appendix 3D as a result of Change 16 were assessed within **Volume 1, Chapter 2** of the **Second ES Addendum** [REP5-064]. Therefore, no further assessment is required. At Deadline 7, the correction in the total number of piles from 28 to 32 will not affect the submitted noise assessments. The effects of piling noise in conjunction with other contemporaneous activities have been assessed in the construction noise assessment for the main development site in **Volume 2, Chapter 11** of the **ES** [APP-202]. It is expected that the additional piles will be placed sequentially, so there will be no additional noise; the noise levels already assessed will simply occur for a marginally longer period, equal to the time taken to place the	

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
			four additional piles. The outcomes already assessed will not change.	
Two Village Bypass Description of Development [REP5-060]	5	The updates included amendments made as a result of Change 17.	Updates made to the Two Village Bypass Description of Development as a result of Change 17 were assessed within **Volume 1, Chapter 3** of the **Second ES Addendum** [REP5-066]. Therefore, no further assessment is required.	No
Sizewell Link Road Description of Development [REP5-058]	5	The updates included amendments made as a result of Change 18.	Updates made to the Sizewell Link Road Description of Development as a result of Change 18 were assessed within **Volume 1, Chapter 4** of the **Second ES Addendum** [REP5-068]. Therefore, no further assessment is required.	No
Volume 2, Chapter 5 Description of Decommissioning (**Volume 3, Appendix 2.B** of this **Fourth ES Addendum**)	7	Chapter has been updated to clarify the assumptions made within the ES with regard to the duration of decommissioning.	No further assessment is required, as the corrections do not change the worst-case assumptions used within the technical assessments of the ES.	No

2.3 Conventional Waste and Material Resources

2.3.1 Additional Information submitted into the Examination in relation to conventional waste and material resources is summarised within **Table 2.2**. The Additional Information comprises clarifications to the ES only and does not change the conclusions of the **ES**, as updated by the subsequent **ES Addenda**.

Table 2.2: Conventional waste and material resources Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		
SZC Co. Comments on Written Representations [REP3-042]	3	SZC Co. response to the written representations received at Deadline 2, including from the Environment Agency.	Comprises clarifications to the ES only, no change to the assessment.	No
Waste Management Strategy Addendum (Doc Ref. 6.3 8A Ad)	7	Submitted in response to ExQ1 W.1.12, to establish and define key performance indicators (KPIs) for the principal waste streams.	Introduces waste targets, no change to the assessment.	No

2.4 Socio-economics

2.4.1 Additional Information submitted into the Examination in relation to socio-economics is summarised within **Table 2.3**. The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES**, as updated by the subsequent **ES Addenda**.

Table 2.3: Socio-economics Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Written Submissions in Response to Oral Submissions made at Open Floor Hearings 18-21 May 2021 [REP2-130]	2	Sets out lessons learnt from the Hinkley Point C project in relation to impacts to the housing market, in response to local concerns raised at the open floor hearing about the potential effects of the Project on the local housing market.	Comprises lessons learnt from Hinkley Point C - no change to the assessment.	No
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		
SZC Co. Comments on	3	SZC Co. response to the written representations	Comprises clarifications to the ES only, no	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Written Representations [REP3-042]		received at Deadline 2, including from ESC, FERN, National Trust, RSPB, Suffolk Constabulary, Therese Coffey MP.	change to the assessment.	
SZC Co. Comments on Councils' Local Impact Report [REP3-044]	3	SZC Co. response to the comments raised in the ESC / SCC Joint Local Impact Report [REP1-045].	Comprises clarifications to the ES only, no change to the assessment.	No
Written Summaries of Oral Submissions made at ISH4: Socio-economic and Community Issues (9 July 2021) [REP5-109]	5	Summary of SZC Co.'s oral submissions made at ISH4.	Comprises clarifications to the ES only, no change to the assessment.	No
Written Submissions Responding to Actions Arising from ISH4: Socio-economic and Community Issues (9 July 2021) [REP5-116]	5	Addresses a number of issues raised at ISH4.	Comprises clarification on matters raised at the ISH4.	No
SZC Co. Comments on Submissions from Earlier Deadlines (Deadlines 2-4) - [REP5-119]	5	SZC Co. comments on responses by Interested Parties.	Comprises clarifications to the ES only, no change to the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No

2.5 Transport

a) Additional Information

2.5.1 Additional Information submitted into the Examination in relation to transport is summarised within **Table 2.4**. As a result of comments received from the Examining Authority, Suffolk County Council and East Suffolk Council, SZC Co. has prepared a revised transport environmental assessment. This is presented within **Volume 3, Appendix 2.C** of this **Fourth ES Addendum**.

2.5.2 All other Additional Information submitted in relation to transport comprises clarifications to the ES, including to help define the detail of mitigation, and does not change the conclusions of **Volume 2, Chapter 10** of the **ES** [APP-198], as updated by **Volume 3, Appendix 2.C** of this **Fourth ES Addendum**.

Table 2.4: Transport Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] and	2	SZC Co. response to the first written questions raised by the Examining Authority.	Includes comments on the transport environmental assessment. An updated assessment in line with the comments received is	Yes
	3 and 5	SZC Co. comments on responses to the first written questions		

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]		submitted by Interested Parties.	provided within **Volume 3 Appendix 2.C** of this **Fourth ES Addendum**.	
Construction Traffic Management Plan - Revision [REP2-054]	2	Updates to Construction Traffic Management Plan made in consultation with stakeholders.	Comprises clarifications and further information on mitigation, no change to the assessment.	No
Construction Worker Travel Plan [REP2-055]	2	Updates to Construction Worker Travel Plan made in consultation with stakeholders.	Comprises clarifications and further information on mitigation, no change to the assessment.	No
Traffic Incident Management Plan [REP2-053]	2	Updates to Traffic Incident Management Plan made in consultation with stakeholders.	Comprises clarifications and further information on mitigation, no change to the assessment.	No
SZC Co. Comments on Written Representations [REP3-042]	3	SZC Co. response to the written representations received at Deadline 2, including from B1122 Action Group, ESC, FERN, Heveningham Hall Estate, Suffolk Constabulary and Therese Coffey MP.	Comprises clarifications to the ES only, no change to the assessment, no change to the assessment.	No
SZC Co. Comments on Councils' Local	3	SZC Co. response to the comments raised in the ESC / SCC Joint	Comprises clarifications to the ES only, no	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Impact Report [REP3-044]		Local Impact Report [REP1-045].	change to the assessment.	
Written Summaries of Oral Submissions made at ISH2: Traffic and Transport Part 1 (7 July 2021) [REP5-107]	5	Summary of SZC Co.'s oral submissions made at ISH2.	Comprises clarifications to the ES only, no change to the assessment.	No
Written Summaries of Oral Submissions made at ISH3: Traffic and Transport Part 2 (8 July 2021) [REP5-108]	5	Summary of SZC Co.'s oral submissions made at ISH3.	Comprises clarifications to the ES only, no change to the assessment.	No
Written Submissions Responding to Actions Arising from ISH2: Traffic and Transport Part 1 (7 July 2021) [REP5-114]	5	Written submissions responding to actions arising from ISH2 on Traffic and Transport (Part 1).	Comprises clarifications to the ES only, no change to the assessment.	No
Written Submissions Responding to Actions Arising from ISH3: Traffic and Transport Part 2 (8 July 2021) [REP5-115]	5	Written submissions responding to actions arising from ISH3 on Traffic and Transport (Part 2).	Comprises clarifications to the ES only, no change to the assessment.	No
Updated Transport	7	Updates to the transport	An updated assessment in line	Yes

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Environmental Assessment (refer to **Volume 3, Appendix 2.C** of this **Fourth ES Addendum**)		environmental assessment in line with comments received from the Examining Authority, SCC and ESC.	with the comments received is provided within **Volume 3 Appendix 2.C** of this **Fourth ES Addendum**.	
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No

b) Updated assessment

2.5.3 As a result of comments received from the Examining Authority, SCC and ESC, SZC Co. has updated the transport environmental assessment. The revised assessment includes updates to the road links screened into the assessment, re-calculated traffic flows and revised assessment criteria for driver delay and pedestrian delay, pedestrian, cyclist and equestrian amenity, fear and intimidation, and road safety. SZC. Co considers that the original approach taken for deriving the traffic flows, which informed both the **ES** [APP-198] and the **First ES Addendum** [AS-181] is appropriate and robust for reasons set out in **Volume 3, Appendix 2.C** of this **Fourth ES Addendum**. Nevertheless, the 24hr AAWT flows have been recalculated using SCC's methodology to establish the potential effects on the transport environmental assessment. The recalculated flows following SCC's methodology have been used to inform the updated assessment of transport effects which are reported in this **Fourth ES Addendum**. Further details on updates made to the assessment and the full revised assessment are provided within **Volume 3, Appendix 2.C** of this **Fourth ES Addendum**.

2.5.4 A package of secondary transport mitigation has been agreed with SCC and ESC, which is to be secured via the draft **Deed of Obligation** (Doc Ref. 8.17(F)). The package of secondary mitigation includes the following:

- Leiston town centre improvement scheme - environmental and safety mitigation
- Wickham Market improvement scheme - environmental and safety mitigation
- Little Glemham and Marlesford improvement scheme - pedestrian enhancements, formal pedestrian crossings, village gateways and speed limits
- Yoxford – pedestrian crossing
- B1125 Westleton and Walberswick – village gateways and pedestrian enhancements.
- B1078 corridor – road safety improvements
- B1122 early years scheme - village gateways at Theberton and Middleton Moor, pedestrian enhancements and formal pedestrian crossing in Theberton, road safety improvements.
- B1122 corridor repurposing - change in use of B1122 to local access road and cycle / pedestrian route as well as integration and promotion of Quiet Lane scheme.
- A12 and A14 signage strategies.

2.5.5 In addition, contributions towards transport improvements have been agreed with SCC and ESC and are to be secured via the draft **Deed of Obligation** (Doc Ref. 8.17(F)).

2.5.6 A transport contingency fund has also been agreed with SCC and ESC, which is to be secured via the draft **Deed of Obligation** (Doc Ref. 8.17(F)) and can be drawn down by the Transport Review Group to mitigate unmitigated transport effects should they arise during the construction phase of the Project.

2.5.7 With the mitigation in place, none of the residual effects identified within the updated environmental transport assessment in **Volume 3, Appendix 2.C** of this **Fourth ES Addendum** are significant. In addition, all significant residual effects previously identified within **Volume 2, Chapter 10** of the **ES** [APP-198], as updated by the subsequent **ES Addenda** [AS-181, REP5-064, REP5-069], have been reduced to not significant as a result of

the additional mitigation secured by the **Deed of Obligation** (Doc Ref. 8.17(F)).

2.6 Noise and Vibration

a) Additional Information

2.6.2 Additional Information submitted into the Examination in relation to noise and vibration is summarised within **Table 2.5**. The Additional Information mostly comprises clarifications to the ES, including to help define the detail of mitigation, and does not change the conclusions of the **ES** as updated by the subsequent **ES Addenda.** This is with the exception of the following:

- Updated Transport Environmental Assessment (refer to **Volume 3, Appendix 2.C** of this **Fourth ES Addendum**); and
- Note on Targeted Consultation for Whitearch Park [REP2-112].

2.6.1 The updated assessment for the above is provided within **section 2.6b)** and **section 2.6c).**

2.6.1 In addition to the information summarised within **Table 2.5**, a **Third ES Addendum** [REP6-017] was submitted to the examination at Deadline 6 to present corrections to road traffic noise modelling for road links associated with the two village bypass, Sizewell link road, Yoxford roundabout and other highway improvements, and an assessment of any new or different significant effects that are likely to result from these corrections.

Table 2.5: Noise and vibration Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
at Deadline 2 [REP3-046] and Deadline 3 [REP5-131]				
SZC Co. Comments on Written Representations [REP3-042]	3	SZC Co. response to the written representations received at Deadline 2, including from B1122 Action Group, ESC, FERN, Heveningham Hall Estate, Historic England, Natural England, Ramblers Association, RSPB/SWT, SCC, Dr Therese Coffey MP, David and Belinda Grant	Comprises clarifications to the ES only, no change to the assessment.	No
SZC Co. Comments on Councils' Local Impact Report [REP3-044]	3	SZC Co. response to the comments raised in the ESC / SCC Joint Local Impact Report [REP1-045].	Comprises clarifications to the ES only, no change to the assessment.	No
Noise Mitigation Scheme [REP2-034], [REP6-015], Doc Ref 6.3 11H(C)	2, 6, 7	Updates to Noise Mitigation Scheme made in consultation with ESC	Comprises clarifications and further information on mitigation included in the ES.	No
Draft Noise Monitoring and Management Plan [REP6-029], Doc Ref. 9.68(A)	6, 7	Draft plan for discussion and agreement with ESC and subsequent revisions	Provides further information on the mitigation referenced in the ES. Part of the hierarchy of construction control documents	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Note on Targeted Consultation for Whitearch Park [REP1-021], [REP2-112]	1, 2	Consultation on assessment of railway noise	Provision of supplementary assessment information on railway noise	Yes
Note on Targeted Consultation for Houseboats in Woodbridge and Melton [REP2-112]	2	Consultation on assessment of railway noise	Provision of supplementary assessment information on railway noise	No
Consultation Report Second Addendum [REP3-009]	3	SZC Co. responses to consultation responses received on the targeted consultation on Whitearch Park and houseboats in Woodbridge and Melton	Comprises clarifications to the rail noise assessment only, no change to the ES.	No
Update to Targeted Consultation for Whitearch Park [REP6-030]	6	Update of previous targeted consultation on railway noise	Update of supplementary assessment information on railway noise	No
Initial Statement of Common Ground – East Suffolk Council and Suffolk County Council Appendix 11A: SZC Co. clarifications in response to questions raised by East Suffolk Council and Suffolk County	3	SZC Co. responses to information requests from ESC and SCC	Comprises clarifications to the ES only, no change to the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Council [REP3-031]				
Initial Statement of Common Ground – East Suffolk Council and Suffolk County Council Appendix 11B: SZC Co. clarifications in response to questions raised by East Suffolk Council and Suffolk County Council (Doc Ref. 9.10.12 B)	7	SZC Co. responses to information requests from ESC and SCC	Comprises clarifications to the ES only, no change to the assessment.	No
Fen Meadow Plan Draft 1 [REP6-026]	6	Information provided by SZC Co. to describe (in draft) the management interventions required to create fen meadow habitats.	Provides additional detail on the works proposed to create fen meadow habitats. No change to the noise assessment.	No
SZC Co. Comments on submissions from earlier deadlines (Deadlines 2-4) [REP5-119]	5	SZC Co. responses to Create Consulting Engineer's submissions on behalf of Dowley Faming Partnership at Deadline 3, and Woodbridge Town Council's submissions at Deadline 2 and Deadline 3	Comprises clarifications to the ES only, no change to the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Comments at Deadline 6 on Earlier Submissions and Subsequent Written Submissions Appendix I: Acoustic Fencing Note [REP6-024]	6	Consideration of planning issues associated with acoustic barriers	Consideration of potential mitigation options for rail noise.	No
Updated Transport Environmental Assessment (refer to **Volume 3, Appendix 2.C** of this **Fourth ES Addendum**)	7	Updates to the transport environmental assessment in line with comments received from the Examining Authority, SCC and ESC, including recalculated 24hr annual average weekday traffic (AAWT) flows in line with a revised methodology requested by SCC.	Provides recalculated 24hr annual average weekday traffic (AAWT) flows	Yes
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
Written Summaries of Oral Submissions made at ISH8: Air Quality, Noise and Vibration (25	7	SZC Co. summary of oral submissions made at ISH8.	Comprises clarifications to the ES only, no change to the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
August 2021) (Doc Ref. 9.79)				
Written Submissions Responding to Actions Arising from ISH8: Air Quality, Noise and Vibration (25 August 2021) (Doc Ref. 9.83)	7	SZC Co. written submissions in response to actions from ISH8.	Comprises clarifications to the ES only, no change to the assessment.	No

b) Updated assessment – road traffic noise assessment

i. Introduction

2.6.2 Calculations have been undertaken of the potential changes in noise impact that could result from the updated transport assessment, as set out in **Volume 3, Appendix 2.C** of this **Fourth ES Addendum**. As set out in **section 2.5** above, the updated traffic flows take account of an alternative approach requested by SCC, which SZC Co. agreed to provide despite SZC Co. considering its original approach to be appropriate and robust.

2.6.3 The noise calculation method has followed the same approach described in **paragraphs 11.6.87 to 11.6.91** of **Volume 2, Chapter 11** of the **ES** [APP-202], where the change in the roadside noise level is determined for each road link. Deviations from the previously-identified changes in the impacts identified in **Volume 3, Appendix 2.6.B** of the **First ES Addendum** [AS-204], which sets out the current position, have been determined. Roads where the changes in impact caused by the updated traffic flows result in changes in the significance of effect are identified.

2.6.4 This approach provides a reasonable indication of the effect of the updated traffic flows. For road traffic noise on existing roads, the method matches that adopted in the submitted assessments, and can be considered on a like-for-like basis.

2.6.5 To provide an indication of the likely effect of the updated traffic flows for the new roads, the road traffic noise levels for the proposed new road links have been calculated for both the traffic data that informed the ES

Addendum assessments, and the updated traffic data. The change in road traffic noise along the new road links gives a broad indication of the potential effect.

2.6.6 In all instances, the changes in road traffic noise along a particular road link should not be equated directly to the change in noise level at every property affected by that particular road. The changes are indicative, since the traffic noise level at any given receptor is likely to be subject to noise from multiple roads, which combine to give a more complex outcome than can be inferred from the change in roadside noise level. This was acknowledged in **paragraph 11.6.91** in **Volume 2, Chapter 11** of the **ES** [APP-202].

ii. Existing Roads

2.6.7 The differences that the updated traffic data make on the changes in road traffic noise along each of the roads assessed in **Volume 3, Appendix 2.6.B** of the **First ES Addendum** [AS-204] have been determined for both the daytime and night-time. Where the traffic flow fell below the lower limit of validity for the Calculation of Road Traffic Noise (CRTN) (Ref. 1), a calculation for that road link has not been undertaken.

2.6.8 The differences that the updated traffic data make on the changes in road traffic noise across the existing roads, as assessed previously in **Volume 3, Appendix 2.6.B** of the **First ES Addendum** [AS-204], are shown in **Table 2.6**.

Table 2.6: Changes in road traffic noise impacts for existing roads

Assessment Scenario	Change in Daytime Noise Impacts, dB	Change in Night-time Noise Impacts, dB(1)
2023	-0.3 to +0.6dB	-0.1 to +0.4dB
2028 Typical Day	-0.1 to +1.0dB	-0.2 to +0.9dB
2028 Busiest Day	-0.2 to +1.0dB	-0.2 to +0.9dB
2034	-0.1 to +0.4dB	-0.1 to +0.1dB
Note: (1) – excludes roads where the traffic flow fell below the lower limit of validity for CRTN		

2.6.9 It can be seen from **Table 2.6** that the updated traffic data are predicted to reduce the previously assessed changes in road traffic noise impact by up to 0.3dB, or increase those previously assessed changes in road traffic noise impact by up to 1dB.

2.6.10 If the updated traffic data were to be used to determine the changes in road traffic on existing roads, the following roads would have a change in the significance of effect:

- In 2023:
  - B1122(N)
  - B1122 through Theberton
  - B1122 north of Sizewell C access
- In 2028 Typical and Busiest Days
  - B1122(S)

2.6.11 In all instances, the significance of the effect would change from 'not significant' to 'significant' in the daytime period in an EIA context, as a result of the updated traffic data.

2.6.12 In each instance the change in significance should not be equated directly to a change in significance at every property affected by that particular road. The changes are indicative, since the traffic noise level at any given receptor is likely to be subject to noise from multiple roads, which combine to give a more complex outcome than can be inferred from the change in roadside noise level.

2.6.13 In general terms, where properties meet the qualifying criteria, they will be eligible for noise insulation, under the **Noise Mitigation Scheme** (Doc Ref. 6.3 11H(C)). However, SZC Co. has committed to providing insulation for all residential properties fronting the B1122, irrespective of the outcome of the refreshed assessments that form part of the **Noise Mitigation Scheme**. Properties fronting the road links identified as likely to have new significant adverse effects, in an EIA context, will therefore benefit from the insulation provided by the **Noise Mitigation Scheme** (Doc Ref. 6.3 11H(C)).

2.6.14 No changes in the significance of effects are predicted during the night-time; the night-time outcomes would remain as shown in **Volume 3, Appendix 2.6.B** of the **First ES Addendum** [AS-204].

iii. Proposed Roads

2.6.15 The potential changes in road traffic noise along each new road link have been calculated. This provides a broad indication of the potential effect of the updated traffic flows on the new roads, although it should not be inferred that the identified changes will occur at all receptors, since the traffic noise level at any location will be determined by a combination of road traffic noise from multiple roads.

2.6.16 The predicted changes in road traffic noise for the new roads are shown in **Table** 2.7. The stated changes are relative to the noise level for each link, based on the traffic data that informed the assessment of road traffic noise from the new roads set out in the **Third ES Addendum** [REP6-017].

Table 2.7: Changes in road traffic noise on new roads

Road	Daytime			Night-time		
	2028 Typical	2028 Busiest	2034	2028 Typical	2028 Busiest	2034
Theberton Bypass	-0.4	-0.4	-0.9	-0.4	-0.4	-1.2
A12 Two Village Bypass	+0.2	+0.1	+0.1	-0.3	-0.4	-0.4
Sizewell Link Road (east of A12)	-1.0	-0.7	-3.8	0	0	-2.2
Theberton Bypass (west of B1125)	-0.5	-0.4	-1.1	-0.4	-0.4	-1.1
Middleton Moor Link	-0.2	-0.1	-0.4	-0.4	-0.3	-0.2
Main Site Access	0	0	0	0	0	0
Northern park and ride	0	0	-(1)	0	0	-(1)
Southern park and ride	-0.1	-0.1	-(1)	0	0	-(1)
Note (1) – the park and ride sites will no longer be in use in 2034						

2.6.17 It can be seen from **Table** 2.7 that the updated traffic data would result in the new roads being quieter than has been taken into account in the assessment, except on the two village bypass during the daytime, where an increase of up to 0.2dB is predicted.

2.6.18 The largest changes are predicted to occur on the Sizewell link road (east of A12) in 2034, where the updated traffic data contains fewer heavy goods vehicle movements than the data that informed the current assessments.

2.6.19 It should also be noted that for the night-time flows, in all instances at least one element of the calculated noise levels fell below the lower limit of validity in CRTN. Where that was the case, the calculation defaulted to the lowest valid value of 50 vehicles per hour.

2.6.20 Given that the outcome at any receptor is the result of noise from a combination of roads, it is unlikely that the changes in road traffic noise set out in **Table** 2.7 would materially affect the outcomes previously identified. However, where a receptor was previously predicted to be close to an impact category threshold, it is possible that impact categories will shift, including between 'significant' and 'not significant' effects. An example

might be a receptor close to the Sizewell link road that had previously been expected to have a daytime in 2034 of +3.1dB, could have an impact of less than +3dB as a result of the changes set out here, and would therefore no longer be significant. Other than close to the two village bypass, which is the only road where a potential increase in traffic noise is possible, albeit a very small increase, none of the changes will create new significant effects.

2.6.21 Notwithstanding the potential for a shift in impact categories, the numbers set out in **Table** 2.7 suggest that the updated traffic data for the proposed roads will not result in a worse impact than is set out in the submitted assessments.

iv. Summary

2.6.22 For existing roads, the changes in road traffic noise impact that result from the updated traffic flows are either a decrease in noise of up to 0.3dB or an increase of up to 1dB. As a result of the updated traffic flows, the daytime impacts on four existing road links are predicted to become significant adverse effects, in an EIA context, that were not previously identified as significant effects.

2.6.23 The updated traffic flows take account of an alternative approach requested by SCC, which SZC Co. agreed to provide despite considering its original approach to be appropriate and robust and the predicted potential increases in road traffic noise effect should be viewed in that context.

2.6.24 All of the road links are along the B1122, and SZC Co. has committed to providing insulation for all residential properties fronting the B1122, irrespective of the outcome of the refreshed assessments that form part of the **Noise Mitigation Scheme** (Doc Ref. 6.3 11H(C)). Properties fronting the road links identified here as likely to have significant adverse effects will therefore benefit from the insulation provided by the **Noise Mitigation Scheme**.

2.6.25 No other changes in the significance of effects are expected from the updated traffic data on existing roads.

2.6.26 For proposed roads, the updated traffic data is unlikely to result in worse effects than are set out in the submitted assessments.

c) Updated assessment – rail noise assessment

2.6.27 Supplemental noise assessments were undertaken as part of a targeted consultation exercise on the potential effects of night-time railway noise on

houseboats in the Woodbridge and Melton areas [REP2-112, electronic page 211] and on the park homes at Whitearch Park, south of Saxmundham [REP2-112, electronic page 178]. The consultation ran from 12th May 2021 to 11th June 2021.

2.6.28 The supplemental noise assessments were envisaged in **paragraph 1.6.6** of **Volume 9, Appendix 4B** of the **ES** [APP-546, electronic page 23].

2.6.29 The supplemental noise assessment for the houseboats found that no houseboats were expected to be exposed to L_{AFmax} noise levels of more than 70dB; no additional significant adverse effects, in an EIA context, were considered likely, even without any consideration of potential acoustic barriers along the railway line.

2.6.30 An update to the supplemental noise assessment for the park homes at Saxmundham was issued on 5th August 2021 [REP6-030], updating the original noise contour plot modelling and suggesting an alternative barrier location, which would be on top of the railway embankment at the southern end of the Whitearch Park site, and then follow the top of the railway cutting at the northern end of the Whitearch Park site.

2.6.31 The supplemental noise assessment for the park homes at Saxmundham showed that two of the park homes could be exposed to L_{AFmax} noise levels of between 70dB and 77dB, with one further park home predicted to be exposed to L_{AFmax} noise levels of more than 77dB. These park homes would be subject to moderate or major adverse effects, which are considered to be significant in the context of the EIA Regulations.

2.6.32 The levels would be below the SOAEL in all instances, except for the single park home predicted to be exposed to L_{AFmax} noise levels above 77dB, which will exceed SOAEL.

2.6.33 It is considered that the improvements in sound insulation offered by the **Noise Mitigation Scheme** (Doc Ref 6.3 11H(C)) will be achievable for the park homes given their modern, high quality construction. Notwithstanding this, the **Noise Mitigation Scheme** (Doc Ref 6.3 11H(C)) has been amended to allow a more flexible approach to the specification of insulation, in recognition for the potential for the construction quality of the homes at Whitearch Park to vary.

2.6.34 On this basis, SOAEL will be avoided for the one park home that is predicted to be exposed to the highest noise level, and the internal sound levels within all three park homes will be mitigated and minimised as required more generally by policy.

2.6.35 The remaining park homes are predicted to be subject to L_{AFmax} noise levels of less than 70dB, which will equate to no more than minor adverse effects, which are not significant in the context of the EIA Regulations.

2.6.36 These outcomes do not rely on the presence of a barrier.

2.6.37 The potential acoustic benefits of a noise barrier located adjacent to the railway line was assessed following the height of the railway line as the embankment reduces in height, and then follows the top of the cutting as the railway drops below the ground level of Whitearch Park. The top of this assessed barrier was set 4m above the railway line for its entire length.

2.6.38 The effect of the updated barrier was found to bring railway noise levels to below 70dB L_{AFmax} at every park home, which is considered to be a negligible or minor adverse effect, when taking account of the residential nature of the park homes. These effects are not considered significant in an EIA context. The noise levels would either fall below LOAEL, or between LOAEL and SOAEL, in all instances.

2.6.39 The supplemental noise assessment and update for the park homes at Saxmundham acknowledged that any proposed barrier, whether on Network Rail land, or on land owned by Whitearch Park, would be subject to discussion with the relevant authorities, including Network Rail, East Suffolk Council and Benhall and Sternfield Parish Council, the owner and residents at Whitearch Park, and subject to the necessary permissions and further assessment of other potential environmental effects, prior to any decision whether or not to install any barriers.

2.6.40 Since the targeted consultation was undertaken, Network Rail confirmed that noise barriers will not be permitted on their land, and therefore the barrier assessed along the edge of the railway embankment would no longer be longer viable. A barrier remains possible for the northern half of Whitearch Park, on land outside of Network Rail's ownership.

2.6.41 Notwithstanding the potential for a noise barrier at Whitearch Park, the **Noise Mitigation Scheme** (Doc Ref 6.3 11H(C)), which has been amended to allow a more flexible approach to the specification of insulation in recognition for the potential for the construction of the homes at Whitearch Park to vary, will enable SOAEL to be avoided at all park homes, and the internal sound levels within all three park homes predicted to be subject to significant effects, in an EIA context, will be mitigated and minimised as required more generally by policy.

2.6.42 On the basis of the supplemental noise assessments, **Table 1.9** in **Volume 9, Appendix 4B** of the **ES** [APP-546, electronic page 23] has been updated as shown in **Table 2.8**. The figures in **Table 2.8** include the additional houseboats and park homes considered in the supplemental noise assessments.

Table 2.8: Updated estimated of numbers of properties exposed to different noise levels from proposed night time use of the East Suffolk line between Saxmundham and Westerfield junction

Noise level, L_{AFmax}, dB (free-field)	Estimated number of dwellings	
	No mitigation	Mitigation (no stops in Saxmundham)
60-69(1)	424-444	349-379
70-77	152-162	100-110
Over 77	41-51	5-10

Notes:

(1) **Table 1.9** in **Volume 9, Appendix 4B** of the **ES** [APP-546, electronic page 23] erroneously labelled this row as "60-79"; "60-69" is correct.

2.7 Air Quality

a) Additional Information

2.7.1 Additional Information submitted into the Examination in relation to air quality is summarised within **Table 2.9.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.9: Air quality Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] and	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
	3 and 5	SZC Co. comments on responses to the first written		

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]		questions submitted by Interested Parties.		
SZC Co. Comments on Written Representations [REP3-042]	3	SZC Co. response to the written representations received at Deadline 2, including from ESC, FERN, Natural England, Woodland Trust, David and Belinda Grant.	Comprises clarifications to the ES only, no change to the assessment.	No
SZC Co. Comments on Councils' Local Impact Report [REP3-044]	3	SZC Co. response to the comments raised in the ESC / SCC Joint Local Impact Report [REP1-045].	Comprises clarifications to the ES only, no change to the assessment.	No
Fen Meadow Plan Draft 1 [REP6-026]	6	Information provided by SZC Co. to describe (in draft) the management interventions required to create fen meadow habitats.	Provides additional detail on the works proposed to create fen meadow habitats. No change to the air quality assessment.	No
Updated Transport Environmental Assessment (refer to **Volume 3, Appendix 2.C** of this **Fourth ES Addendum**)	7	Updates to the transport environmental assessment in line with comments received from the Examining Authority, SCC and	The consequences of the change to traffic flows 'without adjustment' for the air quality assessment are that there would be	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
		ESC, including updated traffic flows to reflect true modelled flows without adjustment, and different annual average daily traffic (AADT) factors applied based on road type, using either 'average A12' or 'B1122' factors.	no changes to the significance of effects to the effects reported in the **First ES Addendum** [AS-127]. The increased predicted flows on the A12 result in a smaller dispersion model adjustment factor being required to align modelled and measured roadside pollutant concentrations. The dispersion model is still calibrated to the same pollutant measurement data. Although there is an increase in the magnitude of the flow and associated emissions from traffic on the A12, the net result of requiring a smaller adjustment factor is that concentration values remain almost unchanged. At the most sensitive air quality receptor location, which is the	

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
			Stratford St Andrew AQMA there is no change to the significance of the effect reported in the **First ES Addendum** [AS-127].	
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
Written Summaries of Oral Submissions made at ISH8: Air Quality, Noise and Vibration (25 August 2021) (Doc Ref. 9.79)	7	SZC Co. summary of oral submissions made at ISH8.	Comprises clarifications to the ES only, no change to the assessment.	No
Written Submissions Responding to Actions Arising from ISH8: Air Quality, Noise and Vibration (25 August 2021) (Doc Ref. 9.83)	7	SZC Co. written submissions in response to actions from ISH8.	Comprises clarifications to the ES only, no change to the assessment.	No

2.8 Landscape and Visual

a) Additional Information

2.8.1 Additional Information submitted into the Examination in relation to the landscape and visual assessment is summarised within **Table 2.10.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.10: Landscape and visual Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Outline Landscape and Ecology Management Plan Revision 2 [REP1-010]	1	Updated to incorporate changes accepted into the examination in April 2021.	No change to the assessment presented within the **First ES Addendum** [AS-181]	No.
SZC Co. response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]	2	SZC Co. response to the first written questions raised by the Examining Authority. Submitted items also included operational phase visualisations [REP2-103] and Hinkley Point C Construction Phase Visual Analysis Report (Appendix 18E [REP2-111].	Comprises clarifications to the ES only, no change to the assessment. Additional visual materials provide further detail in relation to the assessment, but do not change the results of the assessment.	No
	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		
SZC Co. Comments on Written	3	SZC Co. response to the written representations received at Deadline	Comprises clarifications to the ES only, no	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Representations [REP3-042]		2, including from East Suffolk Council, Suffolk County Council, Suffolk Coast and Heaths AONB Partnership, Natural England and the National Trust.	change to the assessment.	
SZC Co. Comments on Councils' Local Impact Report [REP3-044]	3	SZC Co. response to the comments raised in the ESC / SCC Joint Local Impact Report [REP1-045].	Comprises clarifications to the ES only, no change to the assessment.	
Technical Note on Indicative Lighting Modelling [REP3-057]	3	Provision of information to illustrate artificial light levels associated with the construction of Sizewell C and commentary on photometric modelling.	Comprises clarifications to the ES only, no change to the assessment.	No
Two Village Bypass Landscape and Ecological Management Plan [REP5-077]	5	Updates to the LEMP to make it a standalone document aligned with Requirement 22A of the draft Development Consent Order.	Comprises clarifications to the LEMP only, no change to the ES assessment as a result.	No
Sizewell Link Road Landscape and Ecological Management Plan [REP5-076]	5	Updates to the LEMP to make it a standalone document aligned with Requirement 22A of the draft Development Consent Order.	Comprises clarifications to the LEMP only, no change to the ES assessment as a result.	No
Written Summaries of Oral Submissions made at ISH5: Landscape and	5	SZC Co.'s statement to confirm the oral submission made at ISH 5.	Comprises clarifications to the ES only, no change to the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Visual Impact and Design (13 July 2021) [REP5-110]				
Written Submissions Responding to Actions Arising from ISH5: Landscape and Visual Impact and Design (13 July 2021) [REP5-117]	5	SZC Co.'s written submissions responding to actions arising from Issue Specific Hearing 5 (ISH5) on Landscape and Visual Impact and Design held on 13 July 2021	Comprises clarifications to the ES only, no change to the assessment.	No
Main Development Site Permanent and Temporary Beach Landing Facility and SSSI Crossing Plans [REP5-009], Doc Ref. 2.5(B)	5 and 7	Amendments to the design of the SSSI crossing after a design review was carried out in response to stakeholder comments. The proposed changes provide an increased headroom beneath the operational phase bridge deck to facilitate migration of flying insects, two separate decks, one to remain through the construction, operational and decommissioning phase of Sizewell C and the other to be removed following Sizewell C construction and reconfigured footprints within the SSSI, resulting in a marginal decrease of land-take.	Comprises evolution of the design within existing ES parameters, no change to the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Temporary and Permanent Coastal Defence Feature Plans - Not for Approval [REP3-004] [REP5-015]	3, 5	Amendments to the design of the Coastal Defence Feature after a design review was carried out in response to stakeholder concerns around the seaward extent of the sea defences. The updated plans include; pared back line of defence by 5m, a pared back hard coastal defence feature by 15m at the permanent BLF and the deletion of the northern edge of the sheetpiled temporary hard coastal defence feature at the northern edge of the northern mound.	Comprises evolution of the design within existing ES parameters, no change to the assessment.	No
Fen Meadow Plan Draft 1 [REP6-026]	6	Information provided by SZC Co. to describe (in draft) the management interventions required to create fen meadow habitats.	Comprises clarifications to the fen meadow habitat works, no change to the landscape and visual assessment.	No
Volume 2 Main Development Site Chapter 2 Description of Permanent Development Appendix 2B: Lighting	7	Revision 2.0 of the Lighting Management Plan includes provision of a new plan illustrating the location of Dark Corridors	Comprises clarifications to the ES only, no change to the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Management Plan (Doc Ref. 6.3 2B (A))				
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co.'s response to the second written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
Written Summaries of Oral Submissions made at CAH1: Part 2 (18 August 2021)	7	SZC Co.'s statement to confirm the oral submission made at CAH: Part 2.	Comprises clarifications to the ES only, no change to the assessment.	No
Written Submissions Responding to Actions Arising from CAH1: Part 2 (18 August 2021)	7	SZC Co.'s written submissions responding to actions arising from CAH1: Part 2, including additional materials in relation to Theberton House.	Comprises clarifications to the ES only, no change to the assessment.	No

2.9 Terrestrial Ecology and Ornithology

a) Additional Information

2.9.1 Additional Information submitted into the examination in relation to terrestrial ecology and ornithology comprises of following categories:

- additional baseline information;
- additional details of mitigation; and

- additional justification/clarification provided to the Examining Authority and stakeholders in response to comments provided on the DCO Application at various examination deadlines.

i. Additional Baseline Information

2.9.2 Additional baseline information has been submitted into the examination in the form of survey reports. These reports have been prepared to summarise a suite of ecological surveys undertaken in 2020 and 2021, primarily to inform the updated draft protected species licence applications, submitted to Natural England in 2021 and to inform the finalisation of the approach to mitigation for the Sizewell C Project. In a few cases, surveys were undertaken to provide additional information at the request of stakeholders or at the direction of the Examining Authority. A summary of the additional survey reports is provided in **Table 2.11**.

2.9.3 The surveys undertaken do not alter the overall conclusions made in relation to the significance of effects for any of the relevant species reported in the ES. However, in some cases, the surveys have enabled further mitigation details to be defined, which, when deployed, will ensure further that the significance of effects remains as reported in the ES. In the tables below, where the affirmative is used under the heading '*Update to the ES conclusions required*', this should not be taken to mean that there is a change in the significance reported in the ES, but that some aspect for that species required updating, normally in relation to mitigation, in the subsequent assessment text.

2.9.4 The conclusion of the review of additional baseline information provided in **Table 2.11** is that because the Barn Owl Inspection Report (Doc Ref. 6.13B) survey report concludes that additional mitigation measures are required, a short assessment is necessary (provided below the table) to update the conclusions of the ES in relation to barn owls at three sites. The assessment is provided in **section 2.9b)** of this chapter.

Table 2.11: Terrestrial ecology and ornithology additional baseline information

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
Main development site				
Bat Roost Surveys in Trees - Main Development Site	2, 3	To inform draft licence application, which has been	Provision of additional baseline information, which is consistent with	No

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
[REP2-120] [REP3-035]		subsequently submitted at deadline 7 (Doc Ref. 9.92).	the existing ES baseline . No further assessment required.	
Fen Meadow Plan Report 1 Baseline Report [REP3-051] and REP3-052]	3	To provide results of baseline monitoring at the proposed fen meadow habitat creation sites.	Provision of additional baseline information to confirm the feasibility of establishing fen meadow sites. No further assessment required other than usage of data to define the **Fen Meadow Plan** [REP6-026]	No
Fen Meadow Compensation Study 2018 Phase 1 Report [REP4-007]	4	Provision of a report referenced in previous submissions that was not publicly available.	Provides further evidence of the study of alternative fen meadow compensation sites. No further assessment required.	No
White-fronted Geese survey report [REP5-125]	5	Provision of a targeted White-Fronted Goose Survey in winter 2020-2021 as requested by stakeholders.	Provision of additional baseline information consistent with the previous understanding. No further assessment required.	No
Comments at Deadline 6 on Submission from Earlier Submissions and Subsequent Written Submissions to ISH1-ISH6 Appendix J: Main Development Site	6	Provision of a Mycological Desk Study as requested by stakeholders.	Provision of additional baseline information. No change to the assessment presented in the ES	No

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
Mycological Desk Study [REP6-024]				
2021 Bittern Survey Report (Doc Ref. 6.13B)	7	Provision of a targeted Bittern Survey following sightings in 2021 surveys, to identify if Bittern are breeding within the Sizewell Marshes SSSI.	Provision of additional baseline information consistent with the previous understanding. No further assessment required.	No
2021 Bat Crossing Point Surveys	7	Provision of crossing point surveys for main development site, Sizewell link road and Two village bypass to inform draft licence applications and inform design of hop-over features	Provision of additional baseline information to inform draft licence application and hop-over design. No further assessment required.	No
2021 Barn Owl Inspection Report (Doc Ref. 6.13B)	7	Provision of a targeted Barn Owl Survey to continue monitoring on the main development site and following recommendations made during bat tree inspections surveys earlier in 2021.	Provision of additional mitigation measures relevant to the construction works.	Yes
2021 Aquatic Invertebrate Survey (Doc Ref. 6.13B)	7	Provision of updated aquatic invertebrate	Provision of additional baseline information	No

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
		surveys following use of an alternative survey methodology requested by the Environment Agency	consistent with the existing ES baseline. No further assessment required.	
Northern park and ride				
Bat Roost Surveys in Trees - Associated Development [REP2-122]	2	To inform draft licence application submitted at Deadline 7 (Doc Ref. 9.92).	Provision of additional baseline information, which is consistent with the existing ES baseline. No further assessment required.	No
Wintering Bird Survey Report - Northern Park and Ride [REP2-123] [REP3-036]	2, 3	To inform mitigation proposals.		No
Breeding Bird Survey Report - Northern Park and Ride (Doc Ref. 6.13B)	7	To address points raised by stakeholders and to inform mitigation proposals.		No
Great Crested Newt Survey Report 2021-Associated Development (Doc Ref. 6.13B)	7	To inform draft licence application submitted at Deadline 7 (Doc Ref. 6.4 7A.5(A)).		No
Southern park and ride				
Bat Roost Surveys in Trees - Associated Development [REP2-122]	2	To inform draft licence application submitted at deadline 7 (Doc Ref. 9.92).	Provision of additional baseline information which is consistent with the existing ES baseline. No	No

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
Wintering Bird Survey Report - Southern Park and Ride [REP2-124] [REP3-037]	2, 3	To inform mitigation proposals.	further assessment required.	No
Breeding Bird Survey Report - Southern Park and Ride (Doc Ref. 6.13B)	7	To address points raised by stakeholders and to inform mitigation proposals.		No
Two-village bypass				
Bat Roost Surveys in Trees - Associated Development [REP2-122]	2	To inform draft licence application submitted at Deadline 7 (Doc Ref. 9.92).	Provision of additional baseline information consistent with the previous understanding. No further assessment required.	No
Wintering Bird Survey Report - Two Village Bypass [REP2-125] [REP3-038]	2, 3	To inform mitigation proposals.		No
Response to the ExA's Request for Further Information at Deadline 4 Two Village Bypass: Additional Ecology Surveys, Appendix C [REP4-006]	4	To respond to questions raised by the ExA in [PD-027] and provide results of additional surveys undertaken in June 2021 in the Farnham Hall area.		No
Two Village Bypass Bat Surveys (including backtracking, crossing point and roost	7	To respond to questions raised by the ExA at ISH7, to address points raised by stakeholders and to inform		No

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
assessment)(Doc Ref. 6.13B)		draft licence application submitted at Deadline 7 (Doc Ref. 9.92).		
2021 Bat Crossing Point Surveys (Doc Ref. 6.13B)	7	Provision of crossing point surveys to inform draft licence applications and inform design of hop-over features	Provision of additional baseline information to inform draft licence application and hop-over design. No further assessment required.	No
2021 Two Village Bypass Dormice Report 1 (Doc Ref. 6.13B)	7	To respond to questions raised by the ExA at ISH7 and to address points raised by stakeholders.	Provision of baseline information, confirming no sign of dormice during August 2021 survey. No further assessment required.	No
Great Crested Newt (GCN)Survey Report 2021- Associated Development (Doc Ref. 6.13B)	7	To inform mitigation proposals.	Provision of additional baseline information which is consistent with the ES baseline. No further assessment required.	No
2021 Barn Owl Inspection Report (Doc Ref. 6.13B)	7	Provision of a targeted Barn Owl survey following recommendations made during the bat tree inspections surveys earlier in 2021.	Provision of additional mitigation measures relevant to the construction works.	Yes

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
2021 Aquatic Invertebrate Survey (Doc Ref. 6.13B)	7	Provision of updated aquatic invertebrate surveys following use of an alternative survey methodology requested by the Environment Agency	Provision of additional baseline information consistent with . No further assessment required.	No
Sizewell link road				
Bat Roost Surveys in Trees - Associated Development [REP2-122]	2	To inform draft licence application submitted at Deadline 7 (Doc Ref. 9.92).	Provision of additional baseline information which is consistent with the existing ES baseline. No further assessment required.	No
Wintering Bird Survey Report - Sizewell Link Road [REP2-126] [REP3-039]	2, 3	To inform mitigation proposals.		No
GCN Survey Report 2021- Associated Development (Doc Ref. 6.13B)	7	To inform draft licence application submitted at Deadline 7 (Doc Ref. 6.7 7A.5(A)).		No
2021 Barn Owl Inspection Report (Doc Ref. 6.13B)	7	Provision of a targeted Barn Owl survey following recommendations made during the bat tree inspections surveys earlier in 2021.	Provision of additional mitigation measures relevant to the construction works.	Yes

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
2021 Bat Crossing Point Surveys (Doc Ref. 6.13B)	7	Provision of crossing point surveys to inform draft licence applications and inform design of hop-over features	Provision of additional baseline information to inform draft licence application and hop-over design. No further assessment required.	No
Bat Roost Surveys in Trees - Associated Development [REP2-122]	2	To inform draft licence application submitted at Deadline 7 (Doc Ref. 9.92).	Provision of additional baseline information which is consistent with the existing ES baseline. No further assessment required.	No
GCN Survey Report 2021- Associated Development (Doc Ref. 6.13B)	7	To inform mitigation proposals.		No
Freight management facility				
Bat Roost Surveys in Trees - Associated Development [REP2-122]	2	To inform draft licence application submitted at Deadline 7 (Doc Ref. 9.92).	Provision of additional baseline information which is consistent with the existing ES baseline. No further assessment required.	No
Wintering Bird Survey Report - Freight Management Facility [REP2-128] [REP3-041]	2, 3	To inform mitigation proposals.		No
Breeding Bird Survey Report - Freight Management Facility (Doc Ref. 6.13B)	7	To address points raised by stakeholders and to inform mitigation proposals.		No
Rail				
Bat Roost Surveys in Trees - Associated	2	To inform draft licence	Provision of additional baseline	No

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
Development [REP2-122]		application submitted at Deadline 7 (Doc Ref. 9.92).	information which is consistent with the existing ES baseline. No further assessment required.	
Wintering Bird Survey Report - Green Rail Route [REP2-127] [REP3-040]	2, 3	To inform mitigation proposals.		No
GCN Survey Report 2021- Associated Development (Doc Ref. 6.13B)	7	To inform draft licence application submitted at Deadline 7.		No
2021 Saxmundham to Leiston Branch Line Ecological Walk Over (Doc Ref. 6.13B)	7	To inform mitigation proposals.	Identifies the required mitigation measures for the branch line works and identifies where they are already presented in the ES and associated DCO documentation i.e. CoCP.	No

ii. Additional Information on Mitigation

2.9.6 Additional Information on monitoring and mitigation measures has been further defined in discussions with stakeholders through the preparation of the Terrestrial Ecology Monitoring and Mitigation Plan (TEMMP), updated mitigation strategies, non-licensable method statements and draft licences. A summary of the documents submitted into the examination which contain additional Information on mitigation measures, along with the measures included therein, is provided within **Table 2.12.**

2.9.7 Where relevant, the **Mitigation Route Map** (Doc Ref. 8.12(D)) submitted at Deadline 7 has also been updated to take into account the Additional Information on mitigation.

2.9.8 In the review presented in **Table 2.12**, the following documents are considered to require an update to the conclusions of the ES, because the

mitigation measures are new and substantive. SZC Co. Comments on Earlier Submission at Deadline 7, Appendix I: Sizewell C Farmland Bird Fund (Doc Ref. 9.73);

- Natterjack Toad Draft Licence Method Statement [REP5-053];
- Otter Draft Method Statement [REP5-051];
- Green Rail Route Draft Great Crested Newt Licence (Doc Ref. 6.10 7A.5(A)).

2.9.9 The measures within these additional documents are further discussed within **section 2.9b)** of this chapter, including where these remove significant effects.

Table 2.12: Terrestrial ecology and ornithology Additional Information on mitigation

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
Project-wide or multiple Sizewell C Project sites				
Terrestrial Ecology Monitoring and Mitigation Plan (TEMMP) [REP1-016] [REP5-089]	1, 5	To inform DCO Requirement 4.	Collates and updates the monitoring proposals within each of the terrestrial ecology and ornithology assessments presented in Volumes 2 to 9 of the ES and presents them in a single document. The TEMMP provides further detail on the timing, frequency and methodology of surveys during construction and operation. No further assessment required.	No

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
Sizewell C Bat Licence Method Statement (Doc Ref. 9.92)	7	Updated draft licence that supersedes the draft licence included with the DCO Submission [APP-556]. Submitted to obtain a Letter of No Impediment	Provides details of proposed monitoring and replacement/loss rations and proposals creation of additional roost mitigation features at each site, including measures to be taken if additional confirmed roosts are discovered. No further assessment required.	No
SZC Co. Comments on Earlier Submission at Deadline 7 (Doc Ref. 9.73) Appendix I: Sizewell C Farmland Bird Fund	7	Provided following commitments made at Deadline 5.	Provision of a new fund (the Farmland Bird Mitigation Fund) for landowners to provide suitable farmland bird habitat and/or management practices within their land.	Yes
Main development site				
Outline Landscape and Ecology Management Plan Revision 2 [REP1-010]	1	Updated to incorporate changes accepted into the examination in April 2021 (such as the new wetland area).	No change to the assessment presented within the **First ES Addendum** [AS-181]	No
Code of Construction Practice Appendix A: Freshwater Fish and Aquatic Invertebrates Mitigation Strategy	2, 5, 7	To provide an update to the existing mitigation strategy.	Provides details on additional monitoring during the construction phase for Norfolk Hawker. No further	No

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
[REP2-056] [REP5-078] (Doc Ref. 8.11(D))			assessment required.	
Natterjack Toad Draft Licence Method Statement [REP5-053]	5	Updated draft licence that supersedes the draft included with the January Change Submission [AS-209]. Submitted to obtain a Letter of No Impediment from Natural England.	Provides details of more extensive habitat creation proposals including four ponds and improvements to terrestrial habitat in accordance with stakeholder expectations.	Yes
Deptford Pink Draft Licence Method Statement [REP5-052]	5	Updated licence that supersedes the draft included with the January Change Submission [AS-209]. Submitted to obtain a Letter of No Impediment from Natural England.	Provides further detail on seed collection, storage and sowing. No further assessment required.	No
Otter Draft Method Statement [REP5-051]	5	Updated draft licence that supersedes the draft included with the DCO Submission [APP-252]. Submitted to obtain a Letter of No Impediment.	Provides details of pre-construction surveys, buffer zones around retained holts and the creation of a new artificial holt.	Yes
Water Vole Draft Licence Method Statement [REP5-050]	5	Updated draft licence that supersedes the draft included with the January Change Submission [AS-209]. Submitted to	Provides updated details in relation to displacement, capture and relocation, habitat manipulation and monitoring. No	No

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
		obtain a Letter of No Impediment.	further assessment required.	
Marsh Harrier Habitat Report [REP2-119]	2	Updated design report on the Marsh Harrier habitat creation area east of Upper Abbey Farm, updated to include the new wetland	The alterations would not change the assessment presented in **Section 2.9** of the **First ES Addendum** [AS-181].	No
Marsh Harrier Compensatory Habitat Report [REP3-053]	3	To detail the proposed approach to marsh harrier habitat provision on the additional land at Westleton, should the Secretary of State consider that additional compensatory habitat is required.	The alterations would not change the assessment presented **in Section 2.9** of the **First ES Addendum** [AS-181].	No
Draft Badger Licence CONFIDENTIAL [REP5-049]	5	Updated draft licence that supersedes the draft included with the DCO Submission. [APP-225]. Submitted to obtain a Letter of No Impediment from Natural England.	Provides additional information on pre-construction surveys, artificial sett creation and sett closure. No further assessment required.	No
Fen Meadow Plan Draft 1 [REP6-026]	6	To document the proposed management interventions required to create fen meadow habitats at the	Provides additional detail on the works proposed to create fen meadow habitats. The Fen Meadow Plan has been considered in	No

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
		three selected sites.	the EIA context and does not change the conclusions presented in relation to the Fen Meadow Sites within the ES provided at [APP-256]. No further assessment required.	
Outline Vessel Management Plan [REP6-027] (Doc Ref. 9.65(A))	6, 7	The Outline Vessel Management Plan has been developed to provide information on vessel movements and routing, including monitoring, to mitigate potential impacts on red-throated divers	Relevant to the sHRA Report only. The OVMP gives direction on choice of routes and monitoring of vessel movements to facilitate the minimum disturbance to wintering red-throated divers. No further assessment required.	No
Estate Wide Management Plan Appendix A Reptile Mitigation Strategy (Doc Ref. 9.88 A)	7	To update the approach to mitigate effects on reptiles following additional surveys in 2020.	Provides updated details of the proposed reptile capture and exclusion, habitat manipulation, vegetation clearance, hand and destructive searches and welfare. No further assessment required.	No
Northern park and ride				
Great Crested Newt Licence (Doc Ref. 6.4 7A.5(A))	7	Updated draft licence that supersedes the	Licence states that if any GCN are found incidentally during	No

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
		draft included with the DCO Submission. [APP-364]. Submitted to obtain a Letter of No Impediment from Natural England.	the works, these will be moved by hand to the vicinity of the pond 78 (the retained pond). No further assessment required.	
Two village bypass				
Two Village Bypass Landscape and Ecology Management Plan Revision 2 [REP5-077]	5	Updates to the LEMP to make it a standalone document aligned with Requirement 22A of the draft Development Consent Order.	Comprises clarifications to the mitigation measures described in the ES. No further assessment required.	No
Badger Licence Method Statement [REP5-054]	5	Updated draft licence that supersedes the draft included with the DCO Submission [APP-428]. Submitted to obtain a Letter of No Impediment from Natural England.	Provides additional information on pre-construction surveys and sett closure. No further assessment required.	No
Water Vole Licence Method Statement [REP5-055]	5	Updated draft licence that supersedes the draft included with the DCO Submission [APP-426]. Submitted to obtain a Letter of No Impediment.	Provides additional information on precautionary methods of work, displacement, habitat creation and monitoring. No further assessment required.	No
Sizewell link road				

Document Title	Deadline Submitted	Purpose of the submission	Relevance to the ES	Update to the ES conclusions required?
Sizewell Link Road Landscape and Ecology Management Plan [REP5-076] (Doc Ref. 8.3 B (B))	5, 7	Updates to the LEMP to make it a standalone document aligned with Requirement 22A of the draft Development Consent Order.	Comprises clarifications to the mitigation measures described in the ES. No further assessment required.	No
Great Crested Newt Licence (Doc Ref. 6.7 7A.5(A))	7	Updated draft licence that supersedes the draft included with the DCO Submission [APP-462]. Submitted to obtain a Letter of No Impediment from Natural England.	No new information is included other than the survey effort of 2021. No further assessment required.	No
Rail				
Great Crested Newt Licence (Doc Ref. 6.10 7A.5(A))	7	Draft licence submitted to obtain a Letter of No Impediment from Natural England.	No new information is included other than the survey effort of 2021, but this is a new draft licence submission compared to the DCO application in May 2020. No further assessment required.	Yes

Other Information Submitted into Examination

2.9.10 In addition to baseline survey reports and Additional Information on mitigation, a number of clarifications and technical notes have been produced and submitted into examination to respond to specific points raised by stakeholders within their submissions at various deadlines. A summary of these submissions is provided in **Table 2.13**.

2.9.11 In the review presented in **Table 2.13**, the following documents are considered to provide substantive or new additional mitigation or monitoring measures and therefore updates to the conclusions of the ES are required:

- SZC Co. Comments at Deadline 6 on Submissions from Earlier Deadlines and Subsequent Written Submissions to ISH1-ISH6, Appendix C: Sizewell Link Road Watercourse Crossings Mitigation Note [REP6-024]; and
- Lighting Management Plan (Doc Ref. 6.3 2B (A)).

2.9.12 In addition, the **Drainage Strategy** (Doc Ref. 6.3 2A (B)) has been referred to, in order to correct an error within **Volume 6, Chapter 7** of the **ES** [APP-461] and clarify that the use of portal culverts forms primary mitigation.

2.9.13 These reports are further discussed within **section 2.9b)** of this chapter, including where these change the significance of effects.

Table 2.13: Terrestrial ecology and ornithology other information submitted into examination

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Project-wide or multiple Sizewell C Project sites				
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]	2	SZC Co. response to the first written questions raised by the Examining Authority.	Clarification on the conclusions reached in the assessment. No further assessment required	No
	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		
SZC Co. Comments on Written Representations [REP3-042]	3	SZC Co. response to written representations from Environment Agency, Natural England, FERN,	Clarification on the conclusions reached in the assessment. No further	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
		Heveningham Hall Estate, RSPB and SWT	assessment required.	
SZC Co. Comments on Councils' Local Impact Report [REP3-044]	3	SZC Co. response to comments raised by ESC and SCC in the Joint Local Impact Report.	Clarification on the conclusions reached in the assessment. No further assessment required.	No
Written Summaries of Oral Submissions made at ISH7: Biodiversity and Ecology Parts 1 and 2 (15-16 July 2021) [REP5-112]	5	SZC Co.'s statement to confirm the oral submission made at ISH 7.	Clarification on the conclusions reached in the assessment. No further assessment required.	No
SZC Co. Comments on Submissions from Earlier Deadlines (Deadlines 2-4) [REP5-119]	5	SZC Co.'s responses to stakeholders and sign positing to additional information provided.	Clarification on the conclusions reached in the assessment. No further assessment required.	No
SZC Co. Comments on Submissions from Earlier Deadlines (Deadlines 2-4) Appendix Q: Potential combined impact of the MDS and SLR on Bats [REP5-120]	5	A clarification note on the **Updated Bat Impact Assessment** [AS-208] in response to points raised by stakeholders.	Clarification on the conclusions reached in the assessment. No further assessment required.	No
Written Submissions arising from Issue Specific Hearings 7 [REP6-002]	6	SZC Co.'s written responses to commitments made at ISH 7.	Justification of the position presented in the ES. No further	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
			assessment required.	
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Clarification on the conclusions reached in the assessment. No further assessment required.	No
Response to ExA's Commentary on the draft DCO and other Documents (Doc Ref. 9.72)	7	SZC Co.'s response to comments raised on the Bat Mitigation Strategy [APP-252].	Clarification on the conclusions reached in the assessment. No further assessment required.	No
SZC Co. Comments on Earlier Submission at Deadline 7 (Doc Ref. 9.73)	7	SZC Co. response to comments from ESC raised at Deadline 5 in [REP5-138]	Justification of the position presented in the ES. No further assessment required.	No
Written Summaries of Oral Submissions made at ISH10: Biodiversity, Ecology and HRA (27 August 2021) (Doc Ref. 9.81)	7	SZC Co.'s statement to confirm the oral submission made at ISH 10.	Justification of the position presented in the ES. No further assessment required.	No
Written Submissions Responding to Actions Arising from ISH10: Biodiversity, Ecology and HRA (27 August 2021) (Doc Ref. 9.85)	7	SZC Co.'s written responses to commitments made at ISH 10.	Justification of the position presented in the ES. No further assessment required.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Main development site				
Biodiversity Net Gain Report [REP1-004]	1	Updated assessment to reflect the accepted change proposals.	The biodiversity net gain calculations do not change the assessment of effects in the ES. No further assessment required.	No
Technical Note on Indicative Lighting Modelling [REP3-057]	3	Provision of detailed lighting contour plots are requested by stakeholders.	Clarification to support the conclusions reached in the assessment. No further assessment required.	No
SZC Co. Comments on Submissions from Earlier Deadlines (Deadlines 2-4) Appendix L: Abbey Farm Compensation Site [REP5-120]	5	Confirmation that the fen meadow proposals will not impact the Abbey Farm Compensation Site, in response to RSPB comment	The assessment confirms that the site will not be impacted by the fen meadow proposals. No further assessment required.	No
SZC Co. Comments on Submissions from Earlier Deadlines (Deadlines 2-4) Appendix M: Marsh Harrier and Marine Birds [REP5-120]	5	Provision of additional clarifications on the ecological assessment and the sHRA report in response to stakeholder comments	Clarification on the conclusions reached in the assessments. No further assessment required.	No
SZC Co. Comments on Submissions from	5			No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Earlier Deadlines (Deadlines 2-4) Appendix N: Evening Noise and Bird Disturbance [REP5-120]				
SZC Co. Comments on Submissions from Earlier Deadlines (Deadlines 2-4) Appendix O: Response to RSPB and SWT on BNG [REP5-120]	5			No
Deadline 5 Responses from Earlier Deadlines [REP5-120] Appendix J: Future Adaptation of the SSSI Crossing in the DCO Submission	5	Provision of details on the revised adaptive design for the SSSI Crossing crest height.	Provides updated details for design measures (primary mitigation). No changes to the conclusions of the assessment.	No
Main Development Site Permanent and Temporary Beach Landing Facility and SSSI Crossing Plans [REP5-009], Doc Ref. 2.5(B)	5, 7	Provision of updated plans to reflect a design review undertaken in response to stakeholder concerns around the seaward extent of the sea defences.	Updated design. No changes to the conclusions of the assessment.	No
Comments at Deadline 6 on Submission from Earlier Submissions and Subsequent Written Submissions	6	Appendix B: A clarification note on the Updated Bat Impact Assessment [AS-208] in response to	Appendix B: Clarification on the conclusions reached in the assessment.	Appendix B: No Appendix D: No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
to ISH1-ISH6 [REP6-025] Appendix B: In-combination impacts of light and noise on Bats [REP6-024] Appendix D: Collison risk between birds and power lines [REP6-024]		points raised by stakeholders. Appendix D: A clarification note in response to Natural England's continued concern regarding collision risk	No further assessment required. Appendix D: Additional mitigation measure introduced to ensure assessment conclusions (sHRA Report and ES) are robust	
Lighting Management Plan (Doc Ref. 6.3 2B (A))	7	Dark Corridor Plan included within the updated Lighting Management Plan	Additional definition of and securing mitigation measure for bats, Further assessment required.	Yes
Two village bypass				
Biodiversity Net Gain Report [REP1-018], [REP5-091]	1, 5	Updated assessment to reflect the accepted change proposals.	The biodiversity net gain calculations do not change the assessment of effects in the ES. No further assessment required.	No
Two Village Bypass Survey Overview, Appendix B [REP4-006]	4	Provided in response to the ExA's request for additional information [PD-027] on the existing	Summary of baseline presented in the ES and subsequent survey reports.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
		baseline conditions for bats and birds in the Farnham Hall area.	No further assessment required.	
Sizewell link road				
Biodiversity Net Gain Report [REP1-017], [REP5-090]	1, 5	Updated assessment to reflect the accepted change proposals.	The biodiversity net gain calculations do not change the assessment of effects in the ES. No further assessment required.	No
SZC Co. Comments at Deadline 6 on Submissions from Earlier Deadlines and Subsequent Written Submissions to ISH1-ISH6 Appendix C: Sizewell Link Road Watercourse Crossings Mitigation Note [REP6-024]	6	To validate and develop the design of the Sizewell link road that was originally submitted as part of the DCO Application. Identification of new natural enhancement features within design.	Provision of new information on design with additional measures in relation to the enhancement of watercourses. Further assessment required.	Yes
Written Submissions Responding to Actions Arising from ISH7: Biodiversity and Ecology Parts 1 and 2 Appendix E Response to Kelsale-Cum-Carlton Parish Council [REP6-002]	6	To address concerns raised by Kelsale-Cum-Carlton Parish Council in relation to terrestrial ecology assessment.	No change to the assessment presented in the ES	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Drainage Strategy [REP2-033] (Doc Ref. 6.3 2A (B))	2, 7	Provision of updated plans and supporting information in response to stakeholder concerns.	The use of portal culverts was omitted in error from primary mitigation within **Volume 6, Chapter 7** of the **ES** [APP-461]. Hence this addendum corrects this error. Further assessment required.	Yes
Yoxford roundabout and other highway improvements				
Biodiversity Net Gain Report [REP1-019], [REP5-092]	1, 5	Updated assessment to reflect the accepted change proposals.	The biodiversity net gain calculations do not change the assessment of effects in the ES. No further assessment required.	No

b) Updated Assessment

i. Project Wide

2.9.14 The Sizewell C Farmland Bird Mitigation Fund, which is secured under the **Deed of Obligation** (Doc Ref. 8.17(F)), has been introduced to mitigate the impact of habitat loss on farmland birds which is predicted to result in a cumulative effect during the construction of the associated developments, particularly the Sizewell link road and the Two Village bypass, where this construction phase overlaps temporally with other major construction projects in East Suffolk.

2.9.15 SZC Co. will provide a support fund (the Farmland Bird Mitigation Fund) for landowners to provide suitable farmland bird habitat and/or management practices within their land. The introduction of this additional fund is designed to reduce the cumulative effect of the proposals on the farmland bird assemblage, currently reported in the **ES** and the **ES Addenda** as moderate adverse **(significant)** to minor adverse (**not significant**)**.**

ii. Main Development Site:

2.9.16 The review of additional information presented in **Table 2.11** to **Table 2.13** above has identified that an updated assessment is required for the following Important Ecological Features:

- Natterjack Toad;
- Barn Owl;
- Bats; and
- Otter.

Natterjack Toad

2.9.17 The updated draft **Natterjack Toad Licence Method Statement** [REP5-053] submitted at Deadline 5 updates the tertiary mitigation measures listed in **Table 14.19** of **Volume 2**, **Chapter 14** of the **ES** [AS-033] for habitat loss during construction. The changes to the text are shown in red below:

'Natterjack toad mitigation strategy and draft Natural England European Protected Species Licence.

Tertiary mitigation includes enhancements of the retained habitat areas along with the provision of ~~an~~ additional four ~~breeding~~ ponds, terrestrial habitat and refuges.'

2.9.18 The provision of the four ponds and enhanced terrestrial habitat are introduced to align with stakeholders' requests to produce more resilient habitats for the vulnerable natterjack toad population and to facilitate the connectivity of the population with suitable habitats on the Minsmere South Levels. The new measures, although substantive, do not change the overall conclusion reached in the ES on the residual effect from habitat loss on natterjack toads during construction and the effect would remain minor adverse (**not significant).**

Barn Owl

2.9.19 The updated draft **CoCP** (Doc Ref. 8.11 (D)) submitted at Deadline 7 includes the recommendations from the **2021 Barn Owl Inspection Report** (Doc Ref. 6.13B) and updates the tertiary mitigation measures listed in **Table 14.32** of **Volume 2**, **Chapter 14** of the **ES** [AS-033] for barn owl to mitigate disturbance effects during construction. The changes to the CoCP text are shown in red below:

'Habitat creation at Aldhurst Farm, habitat enhancement and establishment for marsh harrier and the creation of the reptile receptor habitat would also provide alternative foraging areas for barn owl.

Barn owl boxes would be installed within the new reptile receptor area to provide additional nesting/roosting opportunities for the local barn owl population.

A Lighting Management Plan for Construction and Operational Sites (Volume 2, Appendix 2B) has been developed to reduce/avoid visual impacts where possible.

Boundary treatments are included within the construction masterplan to minimise noise, lighting and visual disturbance to adjacent designated sites or valuable habitats.

Works in zones where barn owl are present or likely to be present (risk zones) should be designed and supervised by an experienced barn owl worker.

Any aspects of works that involve disturbance to barn owls will be undertaken subject to the conditions of a derogation licence.

In locations where there is a risk that barn owl would be adversely disturbed during the breeding season. Nests will be capped during the non-breeding season.

Where confirmed or potential natal roosts are lost through site clearance or the requirement for capping, alternative sites in the form of barn owl boxes or tree veteranisation will be provided in appropriate locations at a rate of 2 boxes per feature lost.

Boxes will be monitored and maintained on an annual basis for 15 years post construction. It is considered that natural features would have reached sufficient maturity to cease direct intervention at this point.'

2.9.20 There are no changes to the residual effect from disturbance during construction in relation to barn owls and the effect would remain minor adverse (**not significant**).

Bats

2.9.21 The provision of a Dark Corridor Plan which is appended to the updated **Lighting Management Strategy** (Doc Ref. 6.3 2B (A)) and is secured by Requirement, provides a guarantee that three dark corridors will be maintained through the temporary construction area maintained through the temporary construction area. Previous modelled outputs had demonstrated that these dark corridors were achievable but did not provide a securing mechanism. In addition, the realignment of two water management zones and the introduction of two treelines either side of these, will provide new habitat connectivity between Kenton Hills and Ash Cottages. These changes will reduce habitat fragmentation for all bat species compared to the position described in the **First ES Addendum** [AS-208]. It is concluded that the changes enable the habitat fragmentation effect for barbastelle bats, which had previously been assessed as moderate adverse (**significant**) to be reduced and the effect can be updated to minor adverse **(not significant).** The impacts on all bats species arising from habitat and light fragmentation will also reduce as a result of these new mitigation measures but these were considered to result in minor adverse **(not significant)** in the **First ES Addendum** and this will not change as a result of the enhanced mitigation.

Otter

2.9.22 The updated draft **Otter Method Statement** [REP5-051] submitted at Deadline 5 updates the primary and tertiary mitigation measures listed in **Table 14.70** of **Volume 2**, **Chapter 14** of the **ES** [AS-033] for effects due to land take during construction. The changes to the text are shown in red below:

~~'Primary~~ Mitigation includes preconstruction surveys to avoid disturbance or destruction of otter holts, and habitat creation at Aldhurst Farm. An artificial holt will be created to compensate for the loss of an otter holt.'

2.9.23 There are no changes to the residual effect from land take during construction on otters and the effect would remain **minor adverse (not significant).**

2.9.24 The updated draft **Otter Method Statement** [REP5-051] submitted at Deadline 5 updates the primary and tertiary mitigation measures listed in

Table 14.70 of **Volume 2**, **Chapter 14** of the **ES** [AS-033] for disturbance effects during construction. The changes to the text are shown in red below:

'Primary mitigation includes a Lighting Management Plan for Construction and Operational Sites (Volume 2, Appendix 2B) and boundary treatments. A 30m buffer zone would be established from confirmed holts.'

2.9.25 There are no changes to the residual effect from disturbance to otters during construction reported in the ES and the effect would remain negligible (**not significant**).

iii. Two Village Bypass

2.9.26 The review of additional information presented in **Table 2.11** to **Table 2.13** above has identified that an updated assessment is only required for barn owl.

Barn Owl

2.9.27 The updated **CoCP** (Doc Ref. 8.11 (D)) submitted at Deadline 7 includes the recommendations from the **2021 Barn Owl Inspection Report** (Doc Ref. 6.13B) and updates the tertiary mitigation measures listed in **Section 7.5** of **Volume 5**, **Chapter 7** of the **ES** [APP-425]. The additional text is included below:

'Works in zones where barn owl are present or likely to be present (risk zones) should be designed and supervised by an experienced barn owl worker.

Any aspects of works that involve disturbance to barn owls will be undertaken subject to the conditions of a derogation licence.

In locations where there is a risk that barn owl would be adversely disturbed during the breeding season, nests will be capped during the non breeding season.

Where confirmed or potential natal roosts are lost through site clearance or the requirement for capping, alternative sites in the form of barn owl boxes or tree veteranisation will be provided in appropriate locations at a rate of 2 boxes per feature lost.

Boxes will be monitored and maintained on an annual basis for 15 years post construction. It is considered that natural features would have reached sufficient maturity to cease direct intervention at this point.'

2.9.28 The findings of the **2021 Barn Owl Inspection Report** (Doc Ref. 6.13B) do not change the IEFs scoped in for further assessment, as detailed in **Table 7.10** [APP-425] since barn owls form part of the breeding bird assemblage assessed in the ES. Similarly, the findings of the report and the updated mitigation provided in relation to barn owl do not change the conclusions in the **ES,** as updated by subsequent **ES Addenda,** made in relation to the breeding bird assemblage for the two village bypass.

iv. Sizewell Link Road

2.9.29 In line with the updated **Drainage Strategy** (Doc Ref. 6.3 2A (B)), Sizewell Link Road watercourse crossings 1, 2, 3, 5 and 6 would be constructed as portal culverts in which the culvert would straddle the channel and bank leaving them in natural state to avoid impacts on bed geomorphology and also mitigate effects on the upstream and downstream movement of mammals, especially otter. The use of portal culverts as primary mitigation was omitted from **Section 7.5** of **Volume 6**, **Chapter 7** of the **ES** [APP-461] by error.

2.9.30 In addition, the **Sizewell Link Road Watercourse Crossings Mitigation Note** [REP6-024] provides additional primary mitigation measures to those described in **Section 7.5** of **Volume 6**, **Chapter 7** of the **ES** [APP-461]:

- The proposed drainage works would result in a net gain of approximately 389m of watercourse habitat.
- All new ditches would be designed to maximise their ecological function and biodiversity, alongside their hydraulic and other technical requirements.
- In addition, an estimated 34 attenuation basins would be constructed as part of SuDS. These basins and associated drainage channels would also be designed to maximise ecological function and biodiversity through use of SCC's SuDS palette.

2.9.31 The updated **Drainage Strategy** (Doc Ref. 6.3 2A (B)) and the features defined in the **Sizewell Link Road Watercourse Crossings Mitigation Note** [REP6-024] do not result in any changes to the residual effects described in **Tables 7.14** or **7.15** of **Volume 6**, **Chapter 7** of the **ES** [APP-461], as updated by the subsequent **ES Addenda** [AS-185, REP5-068].

2.9.32 The review of additional information presented in **Table 2.11** to **Table 2.13** above has identified that an updated assessment is only required for barn owl.

Barn Owl

2.9.33 The updated **CoCP** (Doc Ref. 8.11 (D)) submitted at Deadline 7 includes the recommendations from the **2021 Barn Owl Inspection Report** (Doc Ref. 6.13B) and updates the tertiary mitigation measures listed in **Section 7.5** of **Volume 6**, **Chapter 7** of the **ES** [APP-461]. The additional text is included below:

'Works in zones where barn owl are present or likely to be present (risk zones) should be designed and supervised by an experienced barn owl worker.

Any aspects of works that involve disturbance to barn owls will be undertaken subject to the conditions of a derogation licence.

In locations where there is a risk that barn owl would be adversely disturbed during the breeding season. Nests will be capped during the non breeding season.

Where confirmed or potential natal roosts are lost through site clearance or the requirement for capping, alternative sites in the form of barn owl boxes or tree veteranisation will be provided in appropriate locations at a rate of 2 boxes per feature lost.

Boxes will be monitored and maintained on an annual basis for 15 years post construction. It is considered that natural features would have reached sufficient maturity to cease direct intervention at this point.

2.9.34 The findings of the **2021 Barn Owl Inspection Report** (Doc Ref. 6.13B) do not change the IEFs scoped in for further assessment, as detailed in **Table 7.11** [APP-461] since barn owls form part of the breeding bird assemblage assessed in the ES. Similarly the findings of the report and the updated mitigation provided in relation to barn owl do not change the conclusions in the ES made in relation to the breeding bird assemblage for the Sizewell link road.

v. Rail

2.9.35 The review of additional information presented in **Table 2.11** to **Table 2.13** above has identified that an updated assessment is only required for great crested newt.

Great Crested Newt

2.9.36 **2021 Saxmundham to Leiston Branch Line Ecological Walk Over** (Doc Ref. 6.13B) has identified the potential for great crested newt to be present along the length of the branch line, in addition to Bratts Black House.

2.9.37 As such, a new Great Crested Newt Licence (Doc Ref. 6.10 7A.5(A)) has been submitted at Deadline 7. The tertiary measures identified in relation to great crested newts for works at Bratts Black House will apply to the works along the entirety of the Saxmundham to Leiston Branch Line.

2.9.38 Whilst the potential for great crested newt along the branch line is recognised, there is no change to the conclusion on the residual effect which arises due to habitat loss and fragmentation during construction. This is because the mitigation that would be in place would ensure that the effect remains minor adverse (**not significant**).

2.10 Amenity and Recreation

a) Additional Information

2.10.1 The Additional Information submitted into the Examination for transport (**section 2.5**), noise and vibration (**section 2.6**), air quality (**section 2.7**), and landscape and visual assessment (**section 2.8**) is also relevant to the amenity and recreation assessment. However, where this information does not alter the aforementioned technical assessments, it also results in no change to the amenity and recreation assessment.

2.10.2 Additional Information that includes information specific to the amenity and recreation assessment and that does alter the aforementioned technical assessments is summarised within **Table 2.14.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.14: Amenity and recreation Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining	2	SZC Co. response to the first written questions raised	Comprises clarifications to the	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]		by the Examining Authority.	ES only, no change to the assessment.	
	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		
SZC Co. Comments on Written Representations [REP3-042]	3	SZC Co. response to the written representations received at Deadline 2, including from Natural England, Suffolk Coast & Heaths AONB Partnership and the Ramblers Association	Comprises clarifications only, no change to the assessment.	No
SZC Co. Comments on Councils' Local Impact Report [REP3-044]	3	SZC Co. response to the comments raised in the ESC / SCC Joint Local Impact Report [REP1-045].	Comprises clarifications only, no change to the assessment.	No
Access and Rights of Way Plans [REP2-007] [REP5-007] [REP5-008]	2, 5	SZC Co.'s changes to reflect ongoing detailed design work and comments from consultees.	Comprises minor changes only, no change to the assessment.	No
Fen Meadow Plan Draft 1 [REP6-026]	6	Information provided by SZC Co. to describe (in draft) the management interventions	Provides additional detail on the works proposed to create fen meadow habitats. Includes changes to the	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
		required to create fen meadow habitats.	setting of Public Rights of Way. No change to the assessment.	
Rights of Way and Access Strategy [REP2-035] [REP3-013] (Doc Ref. 6.3 15I (C))	2, 3, 7	SZC Co.'s changes to reflect ongoing discussions with SCC, and the January Change Submission [AS-181] [AS-190]. At Deadline 7, the strategy has been updated in response to SCC's comments at Deadline 3 [REP3-079] and Deadline 5 [REP5-172].	Includes changes to access proposals. The changes in the January Change Submission [AS-181] [AS-190] have already been assessed in [AS-181]. Other changes to the Rights of Way and Access Strategy do not result in changes to the assessment.	No
Updated Transport Environmental Assessment (refer to **Volume 3, Appendix 2.C** of this **Fourth ES Addendum**)	7	Updates to the transport environmental assessment in line with comments received from the Examining Authority, SCC and ESC.	Comprises changes to the transport assessment due to changes to the assessment methodology. However, the assessed traffic levels have not changed. The updated Transport ES has identified some new significant effects before mitigation. With mitigation these effects would be reduced to not significant, and there are therefore	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
			no changes to the amenity and recreation assessment.	
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Comprises clarifications only, no change to the assessment.	No

2.11 Terrestrial Historic Environment

a) Additional Information

2.11.1 Additional Information submitted into the Examination in relation to the terrestrial historic environment assessment is summarised within **Table 2.15.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.15: Terrestrial historic environment Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]				
SZC Co. Comments on Written Representations [REP3-042]	3	SZC Co. response to the written representations received at Deadline 2, including from B1122 Action Group, ESC, English Heritage Trust, FERN, Heveningham Hall Estate, Historic England, National Trust, RSPB and Owners of the Order Land.	Comprises clarifications only, no change to the assessment.	No
SZC Co. Comments on Councils' Local Impact Report [REP3-044]	3	SZC Co. response to the comments raised in the ESC / SCC Joint Local Impact Report [REP1-045].	Comprises clarifications only, no change to the assessment.	No.
Volume 2 Main Development Site Chapter 16 Terrestrial Historic Environment Appendix 16D: Evaluation Fieldwork Report Addendum - MDS3 and MDS4 [REP3-017]	3	Provides information on approximately 13 hectares of the main development site that was not reported on at submission.	Reports on findings of archaeological trial trenching in areas MDS3 and MDS4.	No.
Volume 5 Two Village Bypass Chapter 9 Terrestrial Historic	3	Provides archaeological geophysical survey results for the full two village bypass -	Reports on findings of archaeological geophysical	No.

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Environment Appendix 9C: Geophysical Survey Report [REP3-020]		updating the report provided at submission with additional survey areas [APP-433].	survey on two village bypass.	
Volume 6 Sizewell Link Road Chapter 9 Terrestrial Historic Environment Appendix 9D: Evaluation Fieldwork Report [REP3-021]	3	Final archaeological evaluation fieldwork report for areas 2, 4C and 4D on the Sizewell link road - updates the interim report provided for these areas at submission [APP-468].	Reports on findings of archaeological trenching on parts of the Sizewell link road.	No.
Volume 3 Environmental Statement Addendum Appendix 2.11.A: Overarching Archaeological Written Scheme of Investigation [REP3-022]	3	Updates the Overarching WSI [APP-275] to address comments provided by SCC Archaeological Service and Historic England during the Examination.	Sets out the archaeological response to the disturbance of remains resulting from the Sizewell C Project, including the overarching procedures and standards for archaeological works.	No.
Sizewell Link Road Evaluation Fieldwork Reports Addendum [REP5-056]	5	Provides information on areas 1, 3a, 3b, 4a, 4b, 7, 9, 10, 11, 12 on the Sizewell Link Road.	Reports on interim findings of archaeological trial trenching on parts of the Sizewell link road.	No
SZC Co. Comments on Submissions from Earlier Deadlines	5	SZC Co. comments on responses by Interested Parties.	Comprises clarifications to the ES only, no change to the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
(Deadlines 2-4) - [REP5-119]				
Fen Meadow Plan Draft 1 [REP6-026]	6	To provide further interim data and defines, in draft, the management interventions required to create fen meadow habitats.	Provides additional detail on the works proposed to create fen meadow habitats. No change to the terrestrial historic environment assessment.	No
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Comprises clarifications only, no change to the assessment.	No.

2.12 Soils and Agriculture

a) Additional Information

2.12.1 Additional Information submitted into the Examination in relation to the soils and agriculture assessment is summarised within **Table 2.16.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.16: Soils and agriculture Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		
SZC Co. Comments on Written Representations [REP3-042]	3	SZC Co. response to the written representations received at Deadline 2, including from Natural England, David and Belinda Grant, Dowley Farming Partnership, Bacon Farms and Sally Watts on behalf of Ms Dyball, Ms Hall and S R Whitwell & Co.	Comprises clarifications to the ES only and a commitment to provide further information (areas of land by grade and scheme component and an updated Outline Soil Management Plan), no change to the assessment.	No
SZC Co. Comments on Councils' Local Impact Report [REP3-044]	3	SZC Co. response to the comments raised in the ESC / SCC Joint Local Impact Report [REP1-045].	Comprises clarifications to the ES and statements relating to requirements and obligations only, no change to the assessment.	No
Volume 2 Appendix 17C: Outline Soil Management Plan [REP3-018]	3	Updates to the Outline Soil Management Plan based on ExQ1 comments raised, Written	Provides further clarity on the measures which will be implemented in the management	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
		Representations and SZC Co responses to these, as well as discussions and development of draft agreement with National Farmers Union (NFU).	of soil handling, storage and reinstatement operations, no change to the assessment.	
SZC Co. Comments at Deadline 6 on Earlier Submissions and Subsequent Written Submissions Appendix E: ALC Land Take Summary Table [REP6-024]	6	Response to a request made at Deadline 2 for a summary breakdown of areas of agricultural land affected (both temporarily and permanently) by grade and by scheme component, with a summary of total areas of Best and Most Versatile (BMV) land affected.	Provides a summary of land areas affected by grade for all scheme components in a single set of tables, no change to the assessment.	No
Fen Meadow Plan Draft 1 [REP6-026]	6	To provide further interim data and defines, in draft, the management interventions required to create fen meadow habitats.	Provides additional detail on the works proposed to create fen meadow habitats. Provides more detail on the potential changes (including soil stripping) and conservation management required to establish and maintain fen meadow habitats.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
			No change to the assessment.	
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Comprises clarifications to the ExQ1 responses only, no change to the assessment.	No

2.13 Geology and Land Quality

a) Additional Information

2.13.1 Additional Information submitted into the Examination in relation to the geology and land quality assessment is summarised within **Table 2.17.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.17: Geology and land quality Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Fen Meadow Plan Draft 1 [REP6-026]	6	Information provided by SZC Co. to describe (in draft) the management interventions required to create fen meadow habitats.	Provides additional detail on the works proposed to create fen meadow habitats. No change to the geology and land quality assessment.	No

2.14 Groundwater and Surface Water

a) Additional Information

2.14.1 Additional Information submitted into the Examination in relation to the groundwater and surface water assessment is summarised within **Table 2.18.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.18: Groundwater and surface water Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		
SZC Co. Comments on Written Representations [REP3-042]	3	SZC Co. response to the written representations received at Deadline 2, including from the Environment Agency, East Suffolk Council, East Suffolk Internal Drainage Board, Natural England, RSPB, Suffolk Wildlife Trust	Comprises clarifications to the ES only, no change to the assessment.	No
SZC Co. Comments on Councils' Local	3	SZC Co. response to the comments raised in the ESC / SCC	Comprises clarifications to the ES only, no	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Impact Report [REP3-044]		Joint Local Impact Report [REP1-045].	change to the assessment.	
Sizewell Link Road Flood Risk Assessment Addendum [REP2-026] [REP5-045]	2, 5	Provision of updated assessment, plans and supporting information to reflect a design review undertaken in response to stakeholder concerns.	Comprises clarifications only, no change to the assessment.	No
Deadline 5 Responses from Earlier Deadlines [REP5-119] • Appendix B: MDS Drainage Technical Note - ACA Drainage Strategy Technical Note • Appendix C: MDS Drainage Technical Note - Sizewell Drain Water Management Control Structure • Appendix D: MDS Drainage Technical Note - Main Development Site Water Management Zone Summary • Appendix E: MDS Drainage Technical Note	5	Provision of updated plans and supporting information to reflect a design review undertaken in response to stakeholder concerns around elements of the Drainage Strategy for the main development site and associated development sites.	The additional details provided are consistent with the original strategy. No change to the assessment presented in the ES.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
- Temporary Marine Outfall Operation Summary • Appendix F: AD Drainage Technical Note - Sizewell Link Road Preliminary Drainage Design Note • Appendix G: AD Drainage Technical Note - Two Village Bypass Preliminary Drainage Design Note • Appendix H: AD Drainage Technical Note - Yoxford Roundabout Updated Drainage Strategy • Appendix I: Sizewell C Main Development Site Flood Risk Assessment: Additional Hydrological Review • Appendix J: Future Adaptation of the SSSI Crossing in the				

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
DCO Submission				
SZC Co. Comments at Deadline 6 on Earlier Submissions and Subsequent Written Submissions [REP6-024] • Appendix A: Northern Park and Ride Drainage Design Note • Appendix C: Sizewell Link Road Watercourse Crossings Mitigation Note • Appendix H: Response to RSPB and SWT on Outline Drainage Strategy • Appendix M: Minsmere Sluice operation and impact review note	6	Appendix A, C, H: Provision of updated plans and supporting information to reflect a design review undertaken in response to stakeholder concerns around elements of the Drainage Strategy for the main development site and associated development sites. Appendix M: Provision of additional justification in response to stakeholder comments	The additional details provided are consistent with the original strategy. No change to the assessment presented in the ES	No
Written Submissions Responding to Actions Arising from ISH7: Biodiversity and Ecology Parts 1	6	SZC Co.'s written responses to commitments made at ISH7	Comprises clarifications to the ES only, no change to the assessment.	No.

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
and 2 (15-16 July 2021) [REP6-002] • Appendix A: Water Level Monitoring Note • Appendix C: Technical Note - Groundwater / surface water near Farnham Hall and Foxburrow Wood				
Fen Meadow Plan Draft 1 [REP6-026]	6	Information provided by SZC Co. to describe (in draft) the management interventions required to create fen meadow habitats.	Comprises clarifications to the fen meadow habitat works only, no change to groundwater and surface water assessment.	No
Drainage Strategy [REP2-033] (Doc Ref. 6.3 2A (B))	2, 7	Provision of updated plans and supporting information in response to stakeholder concerns.	The additional details provided are consistent with the original strategy. No change to the assessment presented in the ES.	No
Water Monitoring Plan (Doc Ref. 9.87)	7	Requirement 7 of the **draft DCO** (Doc Ref. 3.1(G)) requires the approval of a Water Monitoring Plan	Provides a draft version of the Water Monitoring Plan committed to providing in the ES. Provides further detail on	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
			the mitigation proposed in the ES, no change to the assessment.	
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
SZC Co. Comments at Deadline 7 on Submissions from Earlier Deadlines (Doc Ref. 9.73) Appendix G Freight Management Facility Drainage Technical Note Appendix F Southern Park and Rid Drainage Technical Note	7	Provision of updated information and clarifications to reflect a design review undertaken in response to stakeholder concerns around elements of the Drainage Strategy	The additional details provided are consistent with the original strategy. No change to the assessment presented in the ES	No

2.15 Coastal Geomorphology and Hydrodynamics

a) Additional Information

2.15.1 Additional Information submitted into the Examination in relation to the coastal geomorphology and hydrodynamics assessment is summarised within **Table 2.19.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.19: Coastal geomorphology and hydrodynamics Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		
SZC Co. Comments on Written Representations [REP3-042]	3	SZC Co. response to the written representations received at Deadline 2, including from the Environment Agency, National Trust, Natural England, RSPB and Suffolk Wildlife Trust.	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	No
SZC Co. Comments on Councils' Local Impact Report [REP3-044]	3	SZC Co. response to the comments raised in the ESC / SCC Joint Local Impact Report [REP1-045].	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	No
Preliminary design and maintenance requirements for the Sizewell C Coastal Defence	2, 3, 7	Underpins the Coastal Processes Monitoring and Mitigation Plan (CPMMP), sets out:	Additional assessments to demonstrate the viability of the soft coastal defence feature;	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Feature [REP2-115] [REP3-032] (Doc Ref. 9.12(B))		• the basic SCDF description, • how the SCDF would function, • its erosion resistant properties (to avoid HCDF exposure and minimise recharge frequency), and • initial estimates of SCDF recharge requirements (frequency and volume).	no change to the assessment.	
Sizewell C Coastal Defences Design Report [REP2-116]	2	Provided in response to preliminary hearings.	No changes to the conclusions of the assessment.	No
Temporary and Permanent Coastal Defence Feature Plans - Not for approval [REP3-004] [REP5-015]	3, 5	Provision of updated plans to reflect a design review undertaken in response to stakeholder concerns around the seaward extent of the sea defences.	Updated design. No changes to the conclusions of the assessment.	No
Storm Erosion Modelling of the Sizewell C Soft Coastal Defence Feature using XBeach-2D and	3, 7	Underpins the Coastal Processes Monitoring and Mitigation Plan (CPMMP), sets out:	Additional assessments to demonstrate the viability of the soft coastal defence feature;	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
XBeach-G [REP3-048] (Doc Ref. 9.31(A))		• quantifies the erosional response of the SCDF under storm wave conditions • Investigates the sensitivity of SCDF erosion to the grain size used to build and maintain the SCDF • Quantifies erosion volumes used to calculate recharge intervals for the preliminary design and maintenance requirements for the Sizewell C Coastal Defence Feature [REP3-032]	no change to the assessment	
Main Development Site Permanent and Temporary Beach Landing Facility and SSSI Crossing Plans - Not for Approval [REP5-009], Doc Ref. 2.5(B)	5, 7	Provision of updated plans to reflect a design review undertaken in response to stakeholder concerns around the seaward extent of the sea defences.	Updated design. No changes to the conclusions of the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Coastal Processes Monitoring and Mitigation Plan [REP5-059]	5	Update to Revision 1 [AS-237] of the draft coastal processes monitoring and mitigation plan (CPMMP) for consultation with the Sizewell Marine Technical Forum (MTF) prior to agreement of the Regulators (ESC and MMO).	Draft monitoring and mitigation plan provided in line with the DCO Requirement (7A) and the Deemed Marine Licence (DML) Condition 17. No change to the assessment.	No
Written Summaries of Oral Submissions made at ISH6: Coastal Geomorphology [REP5-111]	5	Summary of SZC Co.'s oral submissions made at ISH6.	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	No
Written Submissions Responding to Actions Arising from ISH6: Coastal Geomorphology [REP5-118]	5	Summary of SZC Co.'s written submissions made at ISH6.	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	No
Comments at Deadline 6 on Submission from Earlier Submissions and Subsequent Written Submissions to ISH1-ISH6 – Appendices [REP6-024] Appendix G Response to	6	SZC Co. response to questions raised by the National Trust in written representations in its deadline 3 submission.	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
National Trust Written Representations.				
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	No
SZC Co. Comments at Deadline 7 on Submissions from Earlier Deadlines (Doc Ref. 9.73) Appendix B Coastal geomorphology topic based response to Written Representations Appendix C Specific response to written representations on coastal geomorphology including a response to the Jackson and Cooper report	7	SZC Co. response to questions raised by interested parties in written representations.	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	No

2.16 Marine Water Quality and Sediments

a) Additional Information

2.16.1 Additional Information submitted into the Examination in relation to the marine water quality and sediments assessment is summarised within **Table 2.20.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.20: Marine water quality and sediments Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100]	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
SZC Co. Comments on Written Representations [REP3-042]	3	SZC Co. response to the written representations received at Deadline 2, including from Natural England.		No

2.17 Marine Ecology and Fisheries

a) Additional Information

2.17.1 Additional Information submitted into the Examination in relation to the marine ecology and fisheries assessment is summarised within **Table 2.21.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.21: Marine ecology and fisheries Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] including Appendix 7L Detailed response to questions ExA Ref. Bio 1.242 and 1.243 [REP2-110].	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment outcome.	No
	2	SZC Co. detailed response to Bio 1.242 and 1.243 and provides an updated position on impingement predictions.		
SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		
SZC Co. Comments on Written Representations [REP3-042]	3	SZC Co. response to the written representations received at Deadline 2, including from the Environment Agency, RSPB and Suffolk Wildlife Trust, and Natural England.	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	No
Volume 2 Appendix 22N of the ES: Sizewell C Marine Mammal Mitigation Protocol Revision 2.0 [REP3-019]	3	Revision 2 included the additional piling activities associated with the revised marine freight options which were assessed within the	Additional piling activities associated with the **First ES Addendum** (revised marine freight options)	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
		First E Addendum [AS-181].	[AS-181]; no further assessment required	
Underwater Noise Report [REP5-124]	5	Additional underwater noise assessments for the activities arising from the installation and usage of the Permanent BLF, and the installation, usage, and removal of the Temporary BLF as well as increased vessel traffic.	Detail of the additional underwater noise assessment made in the **First ES Addendum** (for the revised marine freight options) [AS-181]. No further assessment required.	No
Deadline 5 Responses from Earlier Deadlines appendices [REP5-120]. Appendix K: Supplementary Response to Natural England's Written Representations (pg. 1222). Appendix P: Marine Ecology Paper - Response to RSPB and SWT	5	Responses to Part II Issue 22 Fisheries on the use of ICES management units as a population baseline, and Part II Issue 30 Intakes and Outfalls in relation to Twaite shad.	Provides additional information in support of the Applicants use of stock units and clarifies position in relation to twaite shad.	No
		Response to concerns raised by RSPB and SWT relating to the entrapment of marine organisms in the water abstracted by the cooling water system and the subsequent	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
		discharge of dead and moribund biota from the fish recovery and return (FRR) systems and the potential effects on the prey species of predatory birds and changes in water quality.		
Volume 3, Appendix 2.17.A of the First ES Addendum: Supplementary Information on Fish Assessments Report: SPP103 Consideration of potential effects on selected fish stocks at Sizewell [REP6-016].	6	Supplementary information to support the stock/population units for fish assessments in the ES and address comments from interested parties in relation to uncertainty in mitigation efficiencies on local effects assessment.	Provides additional evidence supporting the assessments in the ES and First ES Addendum: Supplementary Information on Fish Assessments Report [AS-238]. No further assessment required.	No
Written Summaries of Oral Submissions made at ISH7: Biodiversity and Ecology Parts 1 and 2 (15-16 July 2021) [REP5-112]	5	Summary of SZC Co.'s oral submissions made at ISH7.	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	No
Written Submissions Responding to Actions Arising from ISH7: Biodiversity and Ecology Parts 1	6	Responses to actions arising from Issue Specific Hearing 7 (ISH7) on Biodiversity and Ecology (Parts 1 and 2) held on 15	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
and 2 (15-16 July 2021) [REP6-002]		and 16 July 2021. These include biofouling, thin fish (entrainment gap), clarifications on mitigation and enhancement measures for smelt and glass eels.		
Evaluation of chlorination dosing options for Sizewell C [REP6-031]	6	Evaluates a range of potential chlorination strategies for use at Sizewell C in order to best meet the required biofouling control of critical plant whilst minimising both operational risks and toxicological effects on non-target species.	Provided for context. The report informed the Sizewell C Water Discharge Activity permit application. No further assessment required	No
Quantifying uncertainty in entrapment predictions for Sizewell C [REP6-028]	6	Determines the sensitivity of entrapment assessments on fish populations to uncertainties in the operational performance of the proposed fish mitigation measures.	Comprises additional evidence supporting the conclusions of the ES. No further assessment required	No
SZC Co. Comments at Deadline 6 on Earlier Submissions and Subsequent Written	6	SZC Co. response to the written submissions at deadline 6 including a technical note outlining the position of SCZ Co. in relation to fish	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Submissions [REP6-024]: Appendix F: Technical Note on EAV and Stock Size		equivalent adult values (EAV) and stock units. Parallels with the Hinkley Point C Water Discharge Activity (WDA) Appeal Inquiry are made.		
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Comprises clarifications to the ES and underpinning technical reports, no change to the assessment.	No
Draft *Sabellaria* Reef Management and Monitoring Plan (Doc Ref. 9.90)	7	Identifies the measures to avoid, reduce and mitigate impacts on *Sabellaria* reef during the installation of the intake heads. An outline of the monitoring options is provided.	Draft management plan provided in line with DML condition 45. Does not affect conclusions of the ES.	No
Draft Fish Impingement Monitoring Plan (Doc Ref. 9.89)	7	Provides an outline of the impingement, entrainment and FRR survival monitoring studies proposed at Sizewell C. An overview of enhancement and mitigation options is included.	Draft monitoring plan provided in line with the DML condition. Does not affect conclusions of the ES.	No

2.18 Marine Historic Environment

a) Additional Information

2.18.1 Additional Information submitted into the Examination in relation to the marine historic environment assessment is summarised within **Table 2.22.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.22: Marine historic environment Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100]	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No

2.19 Marine Navigation

a) Additional Information

2.19.1 Additional Information submitted into the Examination in relation to the marine navigation is summarised within **Table 2.23.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.23: Marine navigation Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
First Written Questions (ExQ1s) [REP2-100]			change to the assessment	
Outline Vessel Management Plan (OVMP) [REP6-027] (Doc Ref. 9.65(A))	6, 7	Potential disturbance to birds (red throated diver) of the Outer Thames Estuary Special Protection Area (SPA) has been raised by several stakeholders. The Outline Vessel Management Plan has been developed to provide information on vessel movements and routing, including monitoring, to mitigate potential impacts on SPA birds.	OVMP provides more detail on marine delivery routes and mitigation measures to avoid disturbance to SPA birds. no further assessment required.	No

2.20 Radiological Considerations

2.20.1 Additional Information submitted into the Examination in relation to radiological considerations is summarised within **Table 2.24.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.24: Radiological considerations Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining	2	SZC Co. response to the first written questions raised	Comprises clarifications to the ES only, no	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]		by the Examining Authority.	change to the assessment.	
	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.		

2.21 Climate Change

a) Additional Information

2.21.1 Additional Information submitted into the Examination in relation to climate change is summarised within **Table 2.25.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.25: Climate change Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining	2	SZC Co. response to the first written questions raised	Clarifications to the ES. A Lifecycle Carbon Assessment was provided within	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]		by the Examining Authority.	**Appendix 9A** [REP2-110]. However, as explained within CC.1.5 [REP2-100], whilst the Lifecycle Carbon Assessment provides an updated estimate of GHG emissions associated with the Sizewell C Project, it does not change the overall conclusions of the assessment presented within **Volume 2, Chapter 26** of the **ES** [APP-342], as updated by subsequent **ES Addenda** [AS-181], namely that the Sizewell C Project will provide a significant contribution to reducing GHG emissions from electricity generation in the long term, and that Sizewell C will not affect the ability of the Government to meet its relevant carbon budgets.	
	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		No
Sizewell Link Road Flood Risk Assessment Addendum [REP2-026] [REP5-045]	2, 5	Provision of updated assessment, plans and supporting information to reflect a design review undertaken in response to	Comprises clarifications to the assessment. No change to the assessment of flood risk.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
		stakeholder concerns.		
Deadline 5 Responses from Earlier Deadlines [REP5-120] Appendix J: Future Adaptation of the SSSI Crossing in the DCO Submission	5	Provision of details on the revised adaptive deign for the SSSI Crossing crest height.	Provides updated details for design measures (primary mitigation). No change to the assessment of flood risk.	No
Two Village Bypass Landscape and Ecological Management Plan [REP5-077]	5	Updates to the LEMP to make it a standalone document aligned with Requirement 22A of the draft Development Consent Order.	Provides updated details of the landscape and ecology management measures (primary mitigation) for two village bypass. The management plan has been drafted to incorporate planting tolerant to existing and future climatic conditions (e.g. resilient to drought and disease) and to provide a strategy for the long-term management of habitats that takes into account climate change adaptation and resilience. Hence, there is no change to the assessment.	No
Sizewell Link Road Landscape and	5	Updates to the LEMP to make it a standalone document	Provides updated details of the landscape and ecology management	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Ecology Management Plan [REP5-076]		aligned with Requirement 22A of the draft Development Consent Order.	measures (primary mitigation) for Sizewell link road. The management plan has been drafted to incorporate planting tolerant to existing and future climatic conditions (e.g. resilient to drought and disease) and to provide a strategy for the long-term management of habitats that takes into account climate change adaptation and resilience. Hence, there is no change to the assessment.	
Drainage Strategy [REP2-033] (Doc Ref. 6.3 2A (B))	2, 7	Provision of updated plans and supporting information in response to stakeholder concerns.	Provides updated details of the drainage design (primary mitigation) across the Sizewell C Project. No change to the assessment of flood risk.	No
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No

2.22 Major Accidents and Disasters

a) Additional Information

2.22.1 Additional Information submitted into the Examination in relation to the major accidents and disasters assessment is summarised within **Table 2.26.**

2.22.2 The Additional Information as summarised in **Table 2.26**, does not change the conclusions of the ES on likely significant effects, however, provides further detail on the measures already referenced in **Volume 2**, **Chapter 27 of** the **ES** [APP-344] and subsequent **ES Addenda** [AS-181]. The Sizewell C Project Environmental Risk Record (included as **Volume 2**, **Chapter 27**, **Appendix 27A** of the **ES** [APP-345]) has been updated to reference the additional information presented in **Table 2.26** and is presented in **Volume 3, Appendix 3.B** of this **Fourth ES Addendum**.

Table 2.26: Major accidents and disasters Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100]	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
Traffic Incident Management Plan [REP2-053]	2	Updates to Traffic Incident Management Plan made in consultation with stakeholders.	Comprises clarifications and further information on mitigation.	No
Construction Traffic Management Plan - Revision [REP2-054]	2	Updates to Construction Traffic Management Plan made in consultation with stakeholders.	Comprises clarifications and further information on mitigation.	No
Construction Worker Travel	2	Updates to Construction Worker Travel Plan made in	Comprises clarifications and further information on mitigation.	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Plan [REP2-055]		consultation with stakeholders.		
Sizewell Link Road Flood Risk Assessment Addendum [REP2-026] [REP5-045]	2, 5	Provision of updated assessment, plans and supporting information to reflect a design review undertaken in response to stakeholder concerns.	Clarifications to the assessment. No change to the assessment of flood risk.	No
Deadline 5 Responses from Earlier Deadlines [REP5-120] Appendix J: Future Adaptation of the SSSI Crossing in the DCO Submission	5	Provision of details on the revised adaptive design for the SSSI Crossing crest height.	Provides updated details for design measures (primary mitigation). No change to the assessment of flood risk.	No
Outline Vessel Management Plan [REP6-027] (Doc Ref. 9.65(A))	6, 7	Provides details of the proposed approach to managing deliveries to the permanent and temporary BLF at the Sizewell C site via the marine route over the period of construction and operation.	Provides additional mitigation and monitoring relevant to the movement and routing of vessels. No change to the assessment of risks from marine navigation.	No.
Drainage Strategy [REP2-033] (Doc Ref. 6.3 2A (B))	2, 7	Provision of updated plans and supporting information in response to	Provides updated details of the drainage design (primary mitigation) across the Sizewell C	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
		stakeholder concerns.	Project. No change to the assessment of flood risk.	

2.23 Health and Wellbeing

2.23.1 The Additional Information submitted into the Examination for socio-economics (see **section 2.4**), transport (**section 2.5**), noise and vibration (**section 2.6**), air quality (**section 2.7**), and radiological considerations (**section 2.20**) is also relevant to the health and wellbeing assessment. However, where this information does not alter the aforementioned technical assessments, it also results in no change to the health and wellbeing assessment.

2.23.2 Additional Information that includes information specific to health and wellbeing and that does alter the aforementioned technical assessments is summarised within **Table 2.27.** The Additional Information comprises clarifications to the ES only, including to help define the detail of mitigation, and does not change the conclusions of the **ES,** as updated by the subsequent **ES Addenda.**

Table 2.27: Health and wellbeing Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
	3 and 5	SZC Co. comments on responses to the first		

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]		written questions submitted by Interested Parties.		
SZC Co. Comments on Councils' Local Impact Report [REP3-044]	3	SZC Co. response to the comments raised in the ESC / SCC Joint Local Impact Report [REP1-045].	Comprises clarifications only, no change to the assessment.	No
Written Submissions Responding to Actions Arising from ISH4: Socio-economic and Community Issues (9 July 2021) [REP5-116]	5	Addresses issues raised at ISH4.	Comprises clarification on the provision of the occupational health service.	No
Updated Transport Environmental Assessment (refer to **Volume 3, Appendix 2.C** of this **Fourth ES Addendum**)	7	Updates to the transport environmental assessment in line with comments received from the Examining Authority, SCC and ESC	Comprises changes to the transport assessment due to changes to the approach to methodology. However, the assessed traffic levels have not changed. The updated Transport ES has identified some new significant effects before mitigation. With mitigation these effects would be mitigated, and there are therefore no changes to the health and wellbeing assessment The assessment further shows that during the course of a typical day,	No

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
			the driver delay varies and does not constitute a material cumulative risk of delay to community care workers, or impact upon their ability or capacity.	
SZC Co. Response to Examining Authority's Second Written Questions (ExQ2s) (Doc Ref. 9.71)	7	SZC Co. response to the second written questions raised by the Examining Authority.	Comprises clarifications only, no change to the assessment.	No.

2.24 Project-Wide, Cumulative and Transboundary Effects

2.24.1 This section presents an update of the inter-relationship, project wide, cumulative and transboundary assessments for the Sizewell C Project to consider relevant Additional information submitted into the examination for the Sizewell C Project. The methodology for these assessments is described in **Volume 10**, **Chapter 1** of the **ES** [APP-572].

a) Inter-relationships effects

i. Additional Information

2.24.2 Additional information relevant to the assessment of inter-relationship effects comprises all of the information summarised in **Section 2.6** (Noise and Vibration), **2.7** (Air Quality) and **2.8** (Landscape and Visual) above.

ii. Updated assessment

2.24.3 The revised traffic data would result in additional significant effects for noise along the B1122 during the 2023 and 2028 assessment scenarios. As a result, a high potential for a significant inter-relationship effects has been identified on the B1122 due to the potential for the noise effect to combine

with air quality and landscape and visual impacts, resulting in a greater sense of disturbance for residential receptors.

2.24.4 SZC Co. has committed to providing noise insulation for all residential properties fronting the B1122. Properties fronting the road links identified as likely to have new significant adverse effects will therefore benefit from the insulation provided by the **Noise Mitigation Scheme** (Doc Ref. 6.3 11H(C)). However, a high potential for a significant inter-relationship effect is considered to remain.

2.24.5 Additional significant effects have also been identified at Whitearch Park due to rail noise, as discussed within **section 2.6** of this chapter. However, Whitearch Park is not likely to experience any discernible effects with regards to air quality and landscape and visual impacts, and therefore there is no potential for inter-relationship effects to arise.

b) Project-wide effects

i. Additional Information

2.24.6 Additional information relevant to the assessment of project-wide effects comprises all of the information summarised in the following sections presented above:

- **Section 2.6**: Noise and vibration;
- **Section 2.7**: Air quality;
- **Section 2.8**: Landscape and visual;
- **Section 2.9**: Terrestrial ecology and ornithology;
- **Section 2.10**: Amenity and recreation;
- **Section 2.11**: Terrestrial historic environment;
- **Section 2.12**: Soils and agriculture;
- **Section 2.13**: Geology and land quality; and
- **Section 2.14**: Groundwater and surface water.

ii. Updated Assessment

2.24.7 The Additional Information summarised in **Sections 2.6** to **2.14** above only results in new significant effects for noise and vibration. However, the new significant effects identified along the B1122 and at Whitearch Park are not considered likely to combine with noise from other sources generated by the proposed development. Therefore, no new significant project-wide effects are considered likely.

2.24.8 There is no potential for other significant project-wide effects to arise as a result of the Additional Information summarised in **Sections 2.6** to **2.14.** This is because the Additional Information has not altered the effect categories within the **ES**, as updated by subsequent **ES Addenda,** for these assessments. In summary, the Additional Information does not change the conclusions of the **ES** and subsequent **ES Addenda** on likely significant project-wide effects, and the conclusions would remain as presented in **Volume 10**, **Chapter 3** of the **ES** [APP-577] and as updated by the **ES Addenda** [AS-189].

c) Cumulative Effects

i. Additional Information

2.24.9 Additional information for the assessment of cumulative effects with other plans, projects and programmes comprises the following categories:

- Additional information relevant to each individual technical assessment, described above in **Sections 2.3** to **2.23**; and
- additional justification/clarification provided to the Examining Authority and stakeholders in response to comments received on the cumulative effects assessment with non-Sizewell C projects, plans and programmes, originally provided within **Volume 10** of the **ES**.

Other Information Submitted into Examination

2.24.10 Further to the Additional Information relevant to each individual technical assessment, described in **Sections 2.2** to **2.23** above, a number of clarifications have been produced and submitted into examination to respond to specific points raised by stakeholders and the Examining Authority in relation to the cumulative effects assessment with non-Sizewell C projects, plans and programmes. A summary of these submissions is provided in **Table 2.28**.

2.24.11 As set out within **Table 2.28,** an updated list of cumulative schemes (i.e. non-Sizewell C projects, plans and programmes) has been provided within **Volume 3, Appendix 2.D** of this **Fourth ES Addendum**. An updated assessment has been provided in subsequent sections of this chapter to consider whether new significant cumulative effects are likely to occur as a result of the updated list of cumulative schemes (see **Annex C** of **Volume 3**, **Appendix 2.D**) and other Additional Information listed within **Sections 2.2** to **2.23** of this chapter.

Table 2.28: Cumulative effects assessment Additional Information

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
SZC Co. Response to Examining Authority's First Written Questions (ExQ1s) [REP2-100] and SZC Co. Comments on Responses to ExQ1s Submitted at Deadline 2 [REP3-046] and Deadline 3 [REP5-132]	2	SZC Co. response to the first written questions raised by the Examining Authority.	Comprises clarifications to the ES only, no change to the assessment.	No
	3 and 5	SZC Co. comments on responses to the first written questions submitted by Interested Parties.		
SZC Co. Comments on Councils' Local Impact Report [REP3-044]	3	SZC Co. response to the comments raised in the ESC / SCC Joint Local Impact Report [REP1-045].	Comprises clarifications only, no change to the assessment.	No
SZC Co. Response to Examining Authority's Second Written Questions	7	In response to Cu.2.6, SZC Co has reviewed and updated the long and short list of non-Sizewell C Project Plans and Programmes to be considered within	Updates the cumulative schemes list considered within the ES.	Yes

Document Title	Deadline Submitted	Purpose of Issue	Relevance to the ES	Update to the ES conclusions required?
(ExQ2) (Doc Ref. 9.71)		the cumulative effects assessment (refer to **Volume 3, Appendix 2.D** of this **Fourth ES Addendum**).		

ii. Updated Assessment

2.24.12 The following section presents an updated cumulative effects assessment with other project, plans and programmes to consider the two elements of Additional Information set out above (i.e. Additional Information provided for specific technical assessments and Additional Information provided for the cumulative effects assessment in general).

2.24.13 The assessment methodology for each of the topics below is consistent with that described within the corresponding section of **Volume 10**, **Chapter 4** of the **ES** [APP-578].

2.24.14 As referenced within **Table 2.28,** an updated list of cumulative schemes has been provided within **Volume 3, Appendix 2.D** of this **Fourth ES Addendum**. The appendix short-lists 33 new schemes for consideration within the cumulative effects assessment. These comprise new planning applications that have been submitted to ESC, SCC, Ipswich Borough Council and Babergh and Mid Suffolk Councils, where parishes are located within the zone of influence of the Sizewell C Project, since the submission of the DCO Application.

2.24.15 During a review of the updated long and short list (refer to **Volume 3, Appendix 2.D** of this **Fourth ES Addendum**), it was concluded that there are no new non-Sizewell C project, plans or programmes that had the potential to result in new cumulative effects for the topics summarised within **Table 2.29**.

2.24.16 The subsequent sections of this chapter provide an updated assessment for:

- Transport;
- Noise and Vibration;

- Air Quality;
- Landscape and Visual;
- Terrestrial Ecology and Ornithology; and
- Major Accidents and Disasters.

Table 2.29: Technical assessments with no change to cumulative effects assessment conclusions

Technical Assessment	Reason for no change to cumulative effects assessment
Conventional Waste and Material Resources	Whilst the updated short listed non-Sizewell C project, plans and programmes would create additional construction waste and require material resources, it is not considered that these would change the conclusions of the waste and material resource cumulative assessment presented within **Volume 10**, **Chapter 4** of the **ES** [APP-578] and subsequent **ES Addenda** [AS-189], based on the expected waste arisings and material quantities required for these schemes. The Additional Information identified within **Section 2.3** would also not change the conclusions of the assessment. Effects would remain significant during early and peak construction and not significant once the Sizewell C Project is operational.
Socio-economics	There is no Additional Information or any new non-Sizewell C projects, plans or programmes that would change the cumulative socio-economic effects. The conclusions remain as presented within **Volume 10**, **Chapter 4** of the **ES** [APP-578] and subsequent **ES Addenda** [AS-189].
Amenity and Recreation	There is no Additional Information or any new non-Sizewell C projects, plans or programmes that would change the cumulative amenity and recreation effects. The conclusions remain as presented within **Volume 10**, **Chapter 4** of the **ES** [APP-578] and subsequent **ES Addenda** [AS-189].
Terrestrial historic environment	There is no Additional Information or any new non-Sizewell C projects, plans or programmes that would change the cumulative historic environment effects. The conclusions remain as presented within **Volume 10**, **Chapter 4** of the **ES** [APP-578] and subsequent **ES Addenda** [AS-189].
Soils and agriculture	Whilst the updated short-listed non-Sizewell C project, plans and programmes would potentially result in additional permanent and temporary loss of best and most versatile (BMV) land, impacts to land holdings (such as reduction in productivity and fragmentation), spread of invasive weed species and impacts associated with dust, pollution and noise,

Technical Assessment	Reason for no change to cumulative effects assessment
	it is not considered that it would change the conclusions of the soils and agriculture cumulative assessment presented within **Volume 10, Chapter 4** of the **ES** [APP-578] and subsequent **ES Addenda** [AS-189]. The Additional Information identified within **Section 2.12** would also not change the conclusions of the assessment. Effects would remain significant in relation to BMV land and not significant or significant in relation to agricultural land holdings and permanent land take, depending on the nature of the land use.
Geology and land quality	There is no Additional Information or any new non-Sizewell C projects, plans or programmes that would result in additional or changed cumulative effects on geology and land quality. The conclusions remain as presented within **Volume 10**, **Chapter 4** of the **ES** [APP-578] and subsequent **ES Addenda** [AS-189].
Groundwater and surface water	There is no Additional Information or any new non-Sizewell C projects, plans or programmes that would result in additional or changed cumulative effects on groundwater and surface water. The conclusions remain as presented within **Volume 10**, **Chapter 4** of the **ES** [APP-578] and subsequent **ES Addenda** [AS-189].
Coastal geomorphology and hydrodynamics	There are no new non-Sizewell C projects, plans and programmes within the marine environment. The Additional Information described in sections 2,15 to 2.19 would not result in additional or changed cumulative effects. The conclusions remain as presented within **Volume 10**, **Chapter 4** of the **ES** [APP-578] and subsequent **ES Addenda** [AS-189].
Marine water quality and sediments	
Marine ecology and fisheries	
Marine historic environment	
Marine navigation	
Radiological considerations	There is no Additional Information or any new non-Sizewell C projects, plans or programmes that would result in additional or changed cumulative radiological effects. The conclusions remain as presented within **Volume 10**, **Chapter 4** of the **ES** [APP-578].
Climate change	As set out within **Volume 10, Chapter 4** of the **ES** [APP-578], the assessment of greenhouse gas emissions against the UK carbon budgets is inherently cumulative. Likely cumulative in-combination climate impacts are covered by the updated technical assessments of this chapter. The consideration of non-Sizewell C projects, plans and programmes is not relevant to the assessment of climate change resilience of the proposed development.

Technical Assessment	Reason for no change to cumulative effects assessment
Health and wellbeing	There is no Additional Information or any new non-Sizewell C projects, plans or programmes that would result in additional or changed cumulative effects on health and wellbeing. The conclusions remain as presented within **Volume 10**, **Chapter 4** of the **ES** [APP-578] and subsequent **ES Addenda** [AS-189].

Transport

2.24.17 The updated cumulative effects assessment considers the information presented in **Table 2.28** and that summarised in **Section 2.5**. It is considered that there is potential for new or different cumulative effects to arise as a result of the following documents:

- The updated short list of non-Sizewell C projects, plans and programmes; and
- The updated Transport Environmental Assessment (refer to **Volume 3, Appendix 2.C of this Fourth ES Addendum**).

2.24.18 These are discussed further below.

Updated Short List

2.24.19 Whilst there are new non-Sizewell C projects since the traffic modelling was undertaken, it is not necessary to revise the cumulative assessment to consider these. The general 'background' traffic growth, which is based on NTEM forecasts as set out in **Appendix 8B** to the **Consolidated Transport Assessment** [REP2-047], accounts for the predicted growth in housing and employment across the study area so the traffic growth generated by these sites is already accounted for in the traffic models.

Updated Transport Environmental Assessment

2.24.20 As a result of comments received from the Examining Authority, SCC and ESC, SZC Co. has updated the transport environmental assessment. The revised assessment includes updates to the road links screened into the assessment, re-calculated traffic flows and revised assessment criteria for driver delay and pedestrian delay, pedestrian, cyclist and equestrian amenity, fear and intimidation, and road safety. Further details on updates made to the assessment and the full revised assessment are provided within **Volume 3, Appendix 2.C** of this **Fourth ES Addendum**.

2.24.21 The mitigation set out in **Section 2.5** also mitigates the cumulative transport effects and there would therefore be no residual significant cumulative transport effects, compared to those set out within **Volume 10, Chapter 4** of the **ES** [APP-578], as updated by the **First ES Addendum** [AS-189].

Noise and Vibration

2.24.22 The revised road traffic noise assessment accounts for traffic from future committed developments as part of the background traffic growth. Therefore, there are no additional cumulative effects to those set out within **Section 2.6** as a result of the Additional Information. There are also a number of non-Sizewell C project, plans and programmes identified on the updated short list (see **Annex C** of **Appendix 2.D**) that could represent new receptors, or result in new or changed cumulative noise and vibration effects.

Schemes with the potential to be additional sensitive receptors

2.24.23 The additional short-listed developments that would be sensitive to effects from noise and vibration include:

- Planning application DC/20/0433/FUL, UA-12[1]: Conversion of a barn to provide nine holiday letting units at Timber Mill Barn, Leiston; and
- Planning application DC/20/1144/FUL, UA-27: Construction of two dwellings at land rear of Wingfield House, Market Place, Saxmundham.

2.24.24 The effects resulting from the Sizewell C Project at UA-12 are represented by receptors MDS 19 and 22 (refer to **Figure 11.1** of **Volume 2**, **Chapter 11** of the **ES** [APP-211]). Therefore, effects at UA-12 can be described as negligible to minor adverse (**not significant**) during day and night) and negligible (**not significant**) during operation.

2.24.25 At UA-27, there are no predicted effects during construction as no works are proposed in the vicinity of this location. During operation there are predicted to be minor adverse effects (**not significant**) associated with the passage of trains on the East Suffolk line, where the proposed change arrangements are implemented at Saxmundham junction to permit trains to access or leave the Saxmundham to Leiston branch line without stopping, as is proposed in the draft **Rail Noise Mitigation Strategy** [AS-258].

[1] Refer to **Volume 3, Appendix 2.D** of this **Fourth ES Addendum** for the cumulative scheme references.

Schemes with the potential for cumulative noise and vibration effects

2.24.26 The short-listed developments with the potential to contribute to cumulative noise effects include:

- Planning application DC/20/0433/FUL, UA-12: Conversion of a barn to provide nine holiday letting units at Timber Mill Barn, Leiston.
- Planning application DC/20/1144/FUL, UA-27: Construction of two dwellings at Land Rear Of Wingfield House, Market Place, Saxmundham
- Planning application DC/21/0980/FUL, UA-113: Construction of a small touring campsite (10 caravans/campervans) at Peakhill Farm, Honeypot Lane, Kelsale Cum Carlton.

2.24.27 Whilst these non-Sizewell C project, plans and programmes would potentially result in additional temporary construction noise they would not change the conclusions of the noise and vibration cumulative assessment presented within **Volume 10, Chapter 4** of the **ES** [APP-578].

Air Quality

2.24.28 There is no Additional Information summarised in **Section 2.8** that would result in new or changed cumulative air quality effects. There are however a number of non-Sizewell C project, plans and programmes identified on the updated short list (see **Annex C** of **Appendix 2.D**) that could either represent new receptors, or result in new or changed cumulative air quality effects.

Schemes with the potential to be additional sensitive receptors

2.24.29 The additional short-listed developments that would be sensitive to effects from air quality include:

- Planning application DC/20/0433/FUL, UA-12: Conversion of a barn to provide nine holiday letting at Timber Mill Barn, Leiston; and
- Planning application DC/20/0902/OUT, UA-19: Demolition of the existing buildings and development of residential units at the current Suffolk Constabulary Force Headquarters in Martlesham.

2.24.30 The effects resulting from the Sizewell C Project at these developments are represented by effects at receptors already included in the assessment. For example, development UA-12 is represented by receptor LE31 and

development UA-19 is represented by LE1 (see **Figure 2.7.1** in [AS-192]). Therefore, no additional receptors need to be included for the future scenarios as the cumulative air quality impact have been assessed as **not significant** at these receptors.

Schemes with the potential for cumulative air quality effects

2.24.31 The short-listed developments that may contribute to cumulative air quality effects include:

- Planning application SCC/0110/20MS, UA-140: Use of land for waste processing and transfer and construction of a biomass boiler building at the land at Masons Landfill Site in Blakenham.

Assessment of potential cumulative effects during construction of Sizewell C

2.24.32 Emissions from the biomass boiler at Site UA-140 has the potential to contribute to cumulative air quality effects in combination with emissions from transport as emissions from the biomass boiler may include nitrogen dioxide (NO_2) and particulate matter (PM_{10}). The predicted impacts from construction and operational traffic associated with the Sizewell C Project are an increase of less than 0.1 µg/m^3 to the annual mean concentrations of NO_2 and PM_{10}, and no significant cumulative effects are expected when combined with the effects from the cumulative development. Site UA-140 is located too far (greater than 10km) from the main development site for there to be the potential for cumulative effects to occur at any sensitive receptor.

Assessment of potential cumulative effects during operation of Sizewell C

2.24.33 Site UA-140 is located too far (greater than 10km) from the main development site for there to be the potential for cumulative effects to occur at any sensitive receptor during the operational phase. In summary, there is no change to the conclusions of the air quality cumulative effects assessment presented within **Volume 10, Chapter 4** of the **ES** [APP-578], as updated by the subsequent **ES Addenda** [AS-189].

Landscape and Visual

2.24.34 There is no Additional Information summarised in **Section 2.8** that would result in new or changed cumulative landscape and visual effects.

2.24.35 The following non-Sizewell C schemes have been scoped into the updated cumulative effects assessment:

- Planning application DC/20/3264/FUL, UA-63: A hybrid application for 129 dwellings and 7 self-build plots at Land Between High Street and Chapel Lane, Pettistree, Suffolk.

Assessment of potential cumulative effects during construction of Sizewell C

2.24.36 Land between High Street and Chapel Lane, Pettistree is a proposed residential development on the southern edge of Wickham Market. The proposal is for 129 dwellings with a further seven self-build plots. Construction is due to start during late 2021/early 2022 and is likely to take in the region of three years to complete. Cumulative effects could occur between the construction and operation of the proposed residential development and the construction, operation and removal and reinstatement of the southern park and ride.

2.24.37 The Landscape and Visual Impact Assessment for the proposed residential development identifies a relatively localised area of visibility for the proposed housing. The extent of effects on landscape character do not extend into the Plateau Estate Farmlands Landscape Character Type (LCT) in which the southern park and ride would be located and the extent of assessment of visual effects does not overlap with the visual receptor groups identified for the southern park and ride in **Volume 4**, **Chapter 6** of the **ES** [APP-390] and subsequent **ES Addenda** [AS-183].

2.24.38 Whilst there would be some areas where both developments may be visible from the same location, such as Representative Viewpoint 10: Public footpath E-430/006/0 south of Wickham Market as prepared in response to the Examining Authority's First Written Questions [REP2-106], given the separation between the proposed residential development and the southern park and ride, this would not result in any significant cumulative visual effects.

2.24.39 Cumulative effects would remain as described in relation to project-wide effects in **Volume 10**, **Chapter 3** [APP-577] and subsequent **ES Addenda** [AS-189] or as described in **Volume 4**, **Chapter 6** of the **ES** [APP-390] and subsequent **ES Addenda** [AS-183] where no project-wide effects have been anticipated.

2.24.40 During the later years of operation and the removal and reinstatement of the southern park and ride, residents of the proposed residential development would become visual receptors. As set out in **Volume 4**, **Chapter 6** of the **ES** [APP-390] and subsequent **ES Addenda** [AS-183], as well as demonstrated by Representative Viewpoint 10 as prepared in

response to the Examining Authority's First Written Questions [REP2-106], there would be no significant visual effects resulting from the later years of operation and the removal and reinstatement of the southern park and ride for residents of the cumulative scheme.

Assessment of potential cumulative effects during operation of Sizewell C

2.24.41 During the operation of Sizewell C, the southern park and ride would already have been removed and reinstated. Consequently, there would be no cumulative effects with the proposed residential development.

Terrestrial Ecology and Ornithology

2.24.42 SZC Co. will provide a support fund (the Farmland Bird Mitigation Fund) for landowners to provide suitable farmland bird habitat and/or management practices within their land. The introduction of this additional fund is designed to reduce the cumulative effect of the proposals, on the farmland bird assemblage, currently reported in the **ES** and the **ES Addenda** as moderate adverse **(significant)** to minor adverse (**not significant**)**.**

2.24.43 There is no other Additional Information summarised in **Section 2.8** that is considered to result in new or changed cumulative effects on terrestrial ecology and ornithology. There are however a number of non-Sizewell C project, plans and programmes identified on the updated short list (see **Annex C** of **Appendix 2.D**) that could result in new or changed cumulative effects on terrestrial ecology and ornithology.

2.24.44 The following non-Sizewell C schemes have been scoped into the updated cumulative effects assessment:

- Planning application DC/20/0902/OUT, UA-19: Demolition of the existing buildings and development of residential units at the current Suffolk Constabulary Force Headquarters in Martlesham;
- Planning application DC/20/2805/FUL, UA-54: Demolition of existing bungalow and erection of two detached dwellings at 123 Bucklesham Road, Purdis Farm, Suffolk;
- Planning application DC/20/3142/FUL, UA-61: Redevelopment of golf course and paddock to provide 170 holiday lodges, three tree houses and other associate buildings and infrastructure at High Lodge Leisure, Saxmundham, Suffolk;

- Planning application DC/20/3264/FUL, UA-63: A hybrid application for 129 dwellings and 7 self-build plots at Land Between High Street and Chapel Lane, Pettistree, Suffolk;
- Planning application DC/20/3890/OUT, UA-75: Residential development for 75 dwellings and associated infrastructure at land along Redwald Road, Rendlesham, Suffolk;
- Planning application DC/20/4709/OUT, UA-85: Demolition of existing dwelling and construction of up to 15 homes with vehicular access at Cherry Lee, Darsham Road, Westleton, Suffolk;
- Planning application DC/20/5224/FUL, UA-100: Construction of 21 residential units with associated infrastructure at land rear of 34-48 Old Station Road, Halesworth, Suffolk;
- Planning application DC/21/1848/FUL, UA-116: Demolition of existing bungalow and erection of three detached bungalows and two semi-detached houses with associated parking at land adjacent to 295 High Road, Trimley, St Martin, Suffolk; and
- Planning application 20/00781/FUL, UA-131: Erection of 96 dwellings and associated infrastructure at areas U, V And W in Ravenswood, Nacton Road, Ipswich, Suffolk.

Early Years and Peak Construction

2.24.45 The important ecological features (IEFs) identified as relevant to the construction assessment are as follows;

- Designated sites, international and national (including qualifying features), special protection areas (SPA), special area of conservation (SAC), Ramsar Site, and site of special scientific interest (SSSI);
- Breeding birds;
- Farmland birds; and
- Protected Species:
  - Great crested newts / amphibians.
  - Reptiles.
  - Bats.

- Badgers.

2.24.46 These IEFs may experience the following cumulative impacts:

- habitat loss, damage and fragmentation;
- incidental mortality; and
- disturbance by increased lighting and noise.

Designated Sites

2.24.47 In addition to those effects described in paragraph 4.8.14 and 4.8.28 of **Volume 10**, **Chapter 4** of the **ES** [APP-578] and **Volume 3**, **Appendix 10.4.C** of the **First ES Addendum** [AS-201] for designated sites, the new non-Sizewell C schemes would result in additional disturbance effects on habitats through increased recreational pressure. To present a worst case assessment, it has been assumed that the residential developments would be complete and occupied during both the early years and peak construction. This would result in the potential for further increases in visitor numbers and subsequently habitat degradation due to nutrient inputs and trampling of vegetation. However, given the requirement for compensatory recreational areas, the provision of Suitable Alternative Natural Greenspaces (SANGs) as identified as a requirement in the Habitats Regulations Assessment of the Suffolk Coastal District Local Plan at Final Draft Plan Stage (Ref. 2), the cumulative effects upon the international and nationally designated sites remain neutral, **not significant** as described in the ES.

Farmland Birds

2.24.48 In addition to those effects described in paragraphs 3.1.13 and 3.1.14 of **Volume 3**, **Chapter 10**, **Appendix 10.4.C** of the **First ES Addendum** [AS-201] for farmland birds, the new non-Sizewell C schemes would likely result in the loss of arable habitats used by farmland birds. Given the distribution of the new non-Sizewell C schemes and that retained habitats in the wider surrounding landscape are extensive, the effects would remain moderate adverse (**significant**) during early years, reducing to minor adverse (**not significant**) during peak construction as described in **Volume 3**, **Chapter 10**, **Appendix 10.4.C** of the **First ES Addendum** [AS-201]. The **Sizewell C Farmland Birds Fund** (See Appendix I of Doc Ref. 9.73) has been prepared to mitigate the impact of habitat loss during the early years of construction on farmland birds. This details a support fund for landowners

to provide suitable farmland bird habitat and/or management practices within their land.

Breeding Birds

2.24.49 In addition to those effects described in paragraph 4.8.18 and 4.8.30 of **Volume 10, Chapter 4** of the **ES** [APP-578] for breeding birds, the new non-Sizewell C schemes would result in additional vegetation clearance. However, retained habitats in the wider surrounding landscape are extensive. Given the distribution of the sites and available habitat in the wider landscape, and that vegetation clearance works will be undertaken outside of the bird nesting season, the overall cumulative effect is likely to be minor adverse and **not significant**.

2.24.50 During the early years, the additional schemes would also result in additional construction related disturbance from noise and lighting. Given the distribution of the sites and that works will be undertaken outside of the bird nesting season, the overall cumulative effect is likely to be minor adverse and **not significant**. During peak construction, it is anticipated that residential dwellings would be occupied and there would be the potential for combined disturbance from noise and lighting. For the reasons defined for the early years assessment, the overall cumulative effect is likely to be minor adverse and **not significant**.

Protected Species

2.24.51 For all non-Sizewell C developments to receive planning permission and where European Protected Species have been confirmed as present, bespoke mitigation strategies and licensing will be required on a site-specific basis to ensure their favourable conservation status is maintained. Where other protected species are present, bespoke mitigation strategies will also be required to satisfy legislative requirements (where relevant). In the event of all early stages of construction phases coinciding, the bespoke mitigation strategies for each non-Sizewell C development and (where appropriate) licensing requirements will ensure the local nature conservation status of these species is maintained, particularly during the site clearance stage to ensure not only suitable, sufficient habitat remains available but also ensure a low risk of incidental mortality. The overall cumulative effects on protected species are considered to remain **not significant**, as identified within **Volume 10**, **Chapter 4** of the **ES** [APP-578] and **Volume 3**, **Appendix 10.4.C** of the **First ES Addendum** [AS-201] (refer to **Table 2.30** for further breakdown).

Summary

2.24.52 In summary the effects would remain as described in **Table 4.1** of **Volume 3**, **Chapter 10**, **Appendix 10.4.C** of the **First ES Addendum** [AS-201] which is replicated below for the relevant IEFs.

Table 2.30: Terrestrial ecology and ornithology cumulative effects assessment summary for Sizewell C and non-Sizewell C developments during construction

Important Ecological Feature	Sensitivity/Valuation	Residual Effect
Designated sites international and national (including qualifying features) SPA, SAC, Ramsar Site, and SSSI.	International and National/High.	Negligible, not significant.
Breeding birds	Local/Low	Minor adverse, not significant.
Farmland birds	Local/Low	Moderate adverse, significant.
Great crested newts / amphibians	County/Medium	Neutral, not significant.
Reptiles	County/Medium	Neutral, not significant.
Bats	County/Medium	Minor adverse, not significant.
Badgers	Local/Low	Minor adverse, not significant.

Removal and Reinstatement of Associated Development sites

2.24.53 It is assumed that whilst the various non-Sizewell C developments would be in their operational phase, habitat areas will have been permanently lost due to the required land take of these developments despite the establishment of their landscape planting schemes. In addition, the presence of the non-Sizewell C developments themselves could result in localised disturbance effects. The updated shortlist is therefore not considered to change the conclusions of paragraphs 4.8.40 to 4.8.45 or the details within **Table 4.9** of **Volume 10**, **Chapter 4** of the **ES** [APP-578], where no likely significant cumulative effects were identified.

Operation

2.24.54 The IEFs identified as relevant to the operational assessment are as follows;

- Designated sites, international and national (including qualifying features), special protection areas (SPA), special area of conservation (SAC), Ramsar Site, and site of special scientific interest (SSSI);
- Farmland birds;
- Breeding bird; and
- Protected species.

2.24.55 These IEFs may experience the following cumulative impacts through disturbance by increased lighting and noise.

Designated Sites

2.24.56 In addition to those effects described in paragraph 4.8.52 of **Volume 10**, **Chapter 4** of the **ES** [APP-578] for designated sites, alternative recreational spaces / SANGs created to support the new non-Sizewell C developments would provide additional recreational opportunities. These additional areas do not change the conclusions of the assessment and an overall slight beneficial (**not significant**) cumulative effect is anticipated in the long-term.

Farmland and Breeding Birds

2.24.57 Given the distribution of the short-listed cumulative schemes and that the habitats included provisions of greenspaces and landscapes of non-Sizewell C projects, plans and programmes would be established, there are no changes to the assessment conclusions presented within **Table 4.10** of **Volume 10**, **Chapter 4** of the **ES** [APP-578]. No likely significant cumulative effects on farmland and breeding birds are identified.

Protected Species

2.24.58 The updated shortlist is not considered to change the assessment conclusions presented within **Table 4.10** of **Volume 10**, **Chapter 4** of the **ES** [APP-578] as any mitigation proposals in relation to compensatory habitats would be well established and roost mitigation agreed with Natural England.

Summary

2.24.59 In summary, the effects would remain as described in **Table 4.10** of **Volume 10, Chapter 4** of the **ES** [APP-578] which is replicated below for the relevant IEFs.

Table 2.31: Terrestrial ecology and ornithology cumulative effects assessment summary for Sizewell C and non-Sizewell C developments during operation

Important Ecological Feature	Sensitivity/Valuation	Residual Effect
Designated sites international and national (including qualifying features) SPA, SAC, Ramsar Site, and SSSI.	International and National/High.	Slight beneficial, not significant.
County wildlife sites (CWS) Sizewell Levels and Associated Areas CWS.	County/Medium	Negligible, not significant.
Breeding birds	Local/Low	Neutral (potentially minor beneficial), not significant.
Farmland birds	Local/Low	Minor adverse, not significant.
Great crested newts / amphibians	County/Medium	Neutral, not significant.
Reptiles	County/Medium	Neutral, not significant.
Bats	County/Medium	Neutral (potentially minor beneficial), not significant.
Badgers	Local/Low	Negligible, not significant.

Major Accidents and Disasters (MA&D)

2.24.60 There is no Additional Information summarised in **Section 2.8** that would result in new or changed cumulative MA&D effects. There are however a number of non-Sizewell C project, plans and programmes identified on the updated short list (see **Annex C** of **Appendix 2.D**) that could either represent new receptors, or result in new or changed cumulative MA&D effects.

2.24.61 The updated short list of plans, projects and programmes provided in **Volume 3, Appendix 2.D** of this **Fourth ES Addendum** identifies a number of schemes which would introduce new population receptors. However, these are considered unlikely to result in a substantial increase of population within the study area and therefore, have not been considered further on a scheme-by-scheme basis.

2.24.62 New infrastructure within the Zone of Influence of the Sizewell C Project which could act as receptors to major accidents and disaster hazards or create new major accident hazards that could affect the Sizewell C Project or the same receptors as the Sizewell C Project include the following:

- Planning application DC/20/4846/EIA, UA-89: Development of a solar energy scheme at B-17 Solar Farm, Parham Airfield, Parham, Suffolk;
- Planning application DC/21/2387/EIA, UA-121: Development of a 21 MWp solar PV scheme at land west of Sandpit House and Sewage Pumping Station, Loudham Hall Road, Pettistree, Suffolk;
- Planning application DC/21/2575/EIA, UA-124; Reservoir at land at Corporation Farm, Drunkards Lane, Falkenham, Ipswich, Kirton;
- Planning application SCC/0110/20MS, UA-140: Use of land for waste processing and transfer and construction of a biomass boiler building at the land at Masons Landfill Site in Blakenham; and
- Planning application SCC/0048/20MS/SCREEN, UA-161: Screening and scoping request for Barham Quarry, Sandy Lane, Barham, Ipswich, Suffolk.

Early Years

2.24.63 The construction of non-Sizewell C schemes identified in above could potentially be concurrent with the early years of the construction of Sizewell C, and, due to their proximity to the Sizewell C Project sites, may increase risks described in **Volume 10**, **Chapter 4** of the **ES** [APP-578] at surrounding receptors or provide new risks to Sizewell C Project sites.

2.24.64 The following risks could be increased as a result of the non-Sizewell C schemes listed above:

- fire and/or explosion at a neighbouring site resulting in injury or death of construction personnel;

- explosion and structural collapse at neighbouring sites resulting in injury or death of construction personnel;
- contamination or release of hazardous substances by off-site sources resulting in increased risk to the safety of members of public and site workers;
- failure or loss of utilities (e.g. electricity, water or telecommunications) as a result of construction on neighbouring sites, limiting the ability of an emergency response plan and environmental and safety management systems to be implemented;
- local accident on motorways and major trunk roads due to increased construction traffic; and
- construction of the non-Sizewell C development limiting the ability of an emergency response plan to be implemented.

2.24.65 The non-Sizewell C projects, plans and programmes require mitigation and control measures to be adopted during the construction. These mitigation measures would include: environmental measures secured through a Code of Construction Practice or equivalent and compliance with relevant legislation and regulatory requirements. Therefore, it is expected that the identified non-Sizewell C projects, plans and programmes would not result in any new significant major accident risks that the Sizewell C Project sites would be susceptible to. Any combined risks with the Sizewell C Project would remain tolerable if as low as reasonably practicable (ALARP) and **not significant** as described in **Volume 10**, **Chapter 4** of the **ES** [APP-578].

2.24.66 All risks to off-site receptors would remain tolerable or tolerable if ALARP (**not significant**) as described in **Volume 10**, **Chapter 4** of the **ES** [APP-578].

Peak Construction

2.24.67 The non-Sizewell C project plans and programmes are assumed to have been constructed by the time of peak construction at the main development site and would, therefore, be operational themselves.

2.24.68 The following risks could be increased, when compared to those in **Volume 10**, **Chapter 4** of the **ES** [APP-578], as a result of the operation non-Sizewell C projects, plans and programmes identified above:

- reservoir flooding;
- fire and/or explosion at a neighbouring site resulting in injury or death of Sizewell C personnel;
- explosion and structural collapse at neighbouring sites resulting in injury or death of Sizewell C personnel;
- failure or loss of utilities (e.g. electricity, water and telecommunications), limiting the ability of an emergency response plan and environmental and safety management systems to be implemented;
- contamination or release of hazardous substances by off-site sources resulting in increased risk to the safety of members of public and site workers; and
- non-Sizewell C schemes limiting the ability of an emergency response plan to be implemented.

2.24.69 The non-Sizewell C projects, plans and programmes would be operated in accordance with granted consents and licences and relevant regulations. Therefore, any combined risks with the Sizewell C Project would remain tolerable if ALARP and **not significant** as described in **Volume 10**, **Chapter 4** of the **ES** [APP-578].

2.24.70 All risks to off-site receptors would remain tolerable or tolerable if ALARP (**not significant**) as described in **Volume 10**, **Chapter 4** of the **ES** [APP-578].

Operation

2.24.71 There are no changes to the operational assessment presented in **Volume 10**, **Chapter 4** of the **ES** [APP-578].

d) Transboundary Effects

i. Additional Information

2.24.72 Additional information relevant to the assessment of transboundary effects comprises all of the information summarised in **Sections 2.2** to **2.23** above.

ii. Updated Assessment

2.24.73 The Additional Information summarised in **Sections 2.2** to **2.23** above does not change the conclusions of the **ES** and subsequent **ES Addenda** on

likely significant effects which could extend across the border. The conclusions would remain as presented in **Volume 10**, **Chapter 5** of the **ES** [APP-580], as updated by the **ES Addenda** [AS-189].

2.25 Conclusion

2.25.1 With the exception of the topics set out below, the review of the Additional information submitted into the examination concluded that such information did not alter the conclusions set out in the **ES** and the subsequent **ES Addenda**. It was concluded that the Additional Information did require updates to the EIA technical assessments:

- Transport;
- Noise and vibration;
- Terrestrial ecology and ornithology; and
- Cumulative effects.

2.25.2 An updated transport environmental assessment has been undertaken in line with comments received from the Examining Authority, Suffolk County Council and East Suffolk Council. In addition, a transport mitigation package has been agreed with Suffolk County Council and East Suffolk Council, which is to be secured through the **Deed of Obligation** (Doc Ref. 8.17(F)). The updated assessment demonstrates that with the agreed transport mitigation package in place, all significant residual effects for transport have been reduced to not significant, including with regards to the cumulative effects assessment.

2.25.3 However, as a result of the revised traffic flows, new likely significant effects have been identified for noise and vibration along the B1122 during the construction phase. SZC Co. has committed to providing noise insulation for all residential properties fronting the B1122. Properties fronting the road links identified as likely to have new significant adverse effects will therefore benefit from the insulation provided by the **Noise Mitigation Scheme** (Doc Ref. 6.3 11H(C)).

2.25.4 Due to the updates to the noise assessment, a high potential for a significant inter-relationship effect along the B1122 has been identified. This is because of the potential for a combination of noise, air quality and visual effects from the Sizewell C Project to result in an increased sense of disturbance at the properties along this road.

2.25.5 In addition, SZC Co. has undertaken a supplemental noise assessment and consultation on rail noise. Additional significant adverse effects were identified at three properties within Whitearch Park. It is considered that the improvements in sound insulation offered by the **Noise Mitigation Scheme** (Doc Ref 6.3 11H(C)) would be implemented for these park homes to mitigate the effect.

2.25.6 The Additional Information on terrestrial ecology and ornithology introduces new mitigation. With the new mitigation in place, specifically a new Sizewell C Farmland Birds Fund included within the **Deed of Obligation** (Doc Ref. 8.17(F)) and a Dark Corridor Plan included within the updated **Lighting Management Plan** (Doc Ref. 6.3 2B (A)), a significant cumulative effect on farmland birds and a significant effect on bats due to habitat fragmentation respectively have been reduced to not significant.

REFERENCES

1. Calculation of Road Traffic Noise (CRTN), Department of Transport, Welsh Office (1988)

2. Hoskin R & Liley D. 2018. Habitat Regulations Assessment of the Suffolk Coastal District Local Plan at Final Draft Plan Stage. Available at: https://www.eastsuffolk.gov.uk/assets/Planning/Suffolk-Coastal-Local-Plan/Final-Draft-Local-Plan/Habitats-Regulations-Assessment.pdf

VOLUME 1, CHAPTER 3: PROPOSED CHANGE 19

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None provided.

FIGURES

APPENDICES

3 PROPOSED CHANGE 19: TEMPORARY DESALINATION PLANT

3.1 Introduction

3.1.1 This chapter of the **Fourth ES Addendum** presents a description of the Proposed Change 19 and updated environmental assessments, where necessary, as a result of this change.

3.1.2 A detailed description of Proposed Change 19 is provided in **section 3.2** of this chapter. **Section 3.3** of this chapter provides an overview of which technical environmental assessments within the ES need updating as a result of the proposed change. Updated environmental assessments are then presented within the subsequent sections of this chapter. **Section 3.13** of this chapter provides an update on the cumulative and transboundary effects assessments as a result of the Proposed Change 19.

3.2 Description of Proposed Change 19

3.2.1 This section provides a description of Proposed Change 19 that comprises a new temporary desalination plant at the main development site. Desalination is the process of removing salt and other minerals from seawater. The desalinated water would then be treated as necessary to create potable water.

3.2.2 An updated tracked change version of **Volume 2, Appendix 3D** (Construction Method Statement) of the **ES** (Doc Ref. 6.3 3D(C) Ch) is submitted alongside this **Fourth ES Addendum** as part of the request for the proposed change at Deadline 7.

a) Proposed development in the Application, as updated by the Accepted Changes

3.2.3 The construction process for the power station will include many activities that require a regular supply of water, both potable and non-potable. The same applies during the operational phase. SZC Co. developed an initial **Water Supply Strategy** that was included in the May 2020 DCO application [APP-601]. This was prepared following engagement with relevant stakeholders including Northumbrian Water Limited (trading locally as Essex and Suffolk Water (“ESW”)) and the Environment Agency.

3.2.4 This initial **Water Supply Strategy** recognised that there is likely to be insufficient potable water available locally to meet the full demands of the Project and identified options to address this likely deficit.

3.2.5 The **Water Supply Strategy Update**, provided in **Appendix 2.2.D** of the **First ES Addendum** [AS-202], considers this further and explains why the proposed new Sizewell transfer main from Barsham Water Treatment Works is the preferred potable water supply for construction and operational purposes, subject to completion of the necessary abstraction sustainability studies to confirm that the supply would be available without causing adverse environmental effects on river flows or wetland sites.

3.2.6 Barsham Water Treatment Works are located in ESW's Northern/Central Water resource Zone (WRZ). There are two separate treatment works at Barsham that would feed the supply – Barsham river works and Barsham bore works. This supply was identified to utilise surplus in ESW's existing licensed abstraction on the River Waveney at the Barsham river works. Barsham bore works would be used to provide security of supply, for example during periods when water quality in the river is unacceptable.

3.2.7 The Sizewell transfer main would be provided by ESW and does not form part of the proposed Sizewell C Project in the Application.

3.2.8 A further update of the Sizewell C Project's **Water Supply Strategy** has been provided at Deadline 7 (Doc Ref. 8.4K(A)). That updated strategy confirms the potable and non-potable water demands of the Project, including the main development site and the off-site associated developments. The strategy also incorporates proposals for temporary desalination to meet some or all of the potable water supply during the construction phase. This is required to mitigate the programme risk in delivery of the proposed Sizewell transfer main, based on current available information.

b) Why is a change proposed?

3.2.9 ESW's Sizewell transfer main would involve construction of approximately 28km of replacement or new high pressure water mains, with associated infrastructure. This would be a significant undertaking and at the present time, before commencement of detailed design and routing studies, there is understandably some significant uncertainty around delivery timescales.

3.2.10 ESW were commissioned by SZC Co. to undertake two tasks:

- *Undertake modelling work to confirm ESW's expectation that it is sustainable to abstract water from this WRZ.* In order to determine whether the Northern/Central WRZ can sustainably provide the water required by Sizewell C, ESW are undertaking an abstraction

sustainability study as part of an Environment Agency led 'Water Industry National Environment Programme' (WINEP) scheme. ESW provided interim feedback to the Examining Authority in June 2021 identifying that the Sizewell C demand may be sustainable, subject to agreement with the Environment Agency. The Environment Agency has requested some additional modelling which is being carried out.

- *Develop an implementation plan for the transfer main.* In June 2021, ESW provided further information on the planning strategy and implementation schedule for the Sizewell transfer main. This confirmed that the transfer main would not be available until December 2024 ***at the earliest***. They have also indicated that there is significant programme risk around this milestone and it may not be fully available until December 2026 (the 'most likely' Central Case); or potentially not until June 2028 or later (the Worst Case). These predicted connection dates are much later than previously expected.

3.2.11 For the early years of construction while the Sizewell transfer main is being constructed, SZC Co.'s expectation was that ESW would be able to balance water between the Northern/Central WRZ and the local Blyth WRZ using existing network connections with no net increase in abstraction within the Blyth WRZ. However, ESW have now confirmed that this is not feasible due to technical constraints within the network.

3.2.12 Now that SZC Co. has received this information, it is clear that a temporary supplementary potable water source is necessary until such time that the proposed Sizewell transfer main is available. Plans have been progressed at the earliest opportunity.

3.2.13 Further details on the Project's expected demand for potable water and the need for a temporary supplementary source to meet this demand before the Sizewell transfer main is available are set out below.

i. Potable water demand profile

3.2.14 The amount of water required by the Project varies throughout the construction period depending on the types of construction activity that are taking place.

3.2.15 SZC Co. has sought to minimise the demand for potable water through measures such as:

- recycling potable water in certain construction processes (see below for further details);

- using non-potable water where feasible (e.g. dust suppression, vehicle washing and wheel washing);
- storing non-potable water to help ensure a continual supply; and,
- using water reduction fixtures and fittings within site buildings.

3.2.16 Construction activities will recycle water through the construction process as follows:

- Recycling the slurry returned from the Tunnel Boring Machines (TBMs) during certain marine tunnelling works. This is expected to reduce potable water demand associated with this activity by 30%;
- Adopting a similar process for the cut-off wall, to also reduce demand associated with this activity by an expected 60%; and
- Adopting specific measures to reduce potable water demand associated with the concrete batching process by approximately 20%.

3.2.17 A temporary solution to sourcing potable water remains necessary however because:

- The specialist nature of some construction activities on the site requires significant quantities of potable water;
- ESW, in consultation with the Environment Agency, have confirmed that no such water can be supplied to Sizewell C from the local Blyth water catchment area in the short term; and
- The Sizewell transfer main, which would connect into the neighbouring Northern/Central water catchment area, will not be delivered until at least two years after construction is scheduled to start and may not be available for a number of years later than that.

3.2.18 During the early years of construction, the demand for potable water is predicted to peak at approximately 2.6 Megalitres (Ml) per day (2,600 cubic metres per day). The potable water demand in this initial period is largely driven by the installation of the below-ground cut-off wall to hydraulically isolate the main platform from the wider environment before dewatering and deep excavation works can commence. Installing the cut-off wall is on the critical path for the construction programme.

3.2.19 During the main civil works, a peak demand of 4Ml per day (4,000 cubic metres per day) is predicted to be required. This demand is largely driven by concrete batching, construction of the cooling water tunnels, placement of structural fill and welfare demands for the construction workforce.

c) Description of the Proposed Change

3.2.20 As set out above, SZC Co. continues to engage closely with Essex and Suffolk Water on delivery of the Sizewell transfer main. However, the unavailability of this main for at least the first two years of construction, and potentially longer, requires a temporary additional water supply to be secured in order to meet the Project's predicted water demand.

3.2.21 The proposed change to the Application is therefore for a temporary construction-phase desalination plant. Desalination is the process of removing salt and other minerals from seawater. The desalinated water would then be treated as necessary to create potable water. The information set out in this section is also contained within the updated **Construction Method Statement** (Doc Ref. 6.3 3D(C) Ch) submitted at Deadline 7 and secured under Requirement 8 of the draft **Development Consent Order** (Doc Ref. 3.1(G)).

3.2.22 The desalination plant will be required before the Sizewell transfer main is fully available. It is certain to be required to meet the 2.6 Ml/day potable water demand during the early years. Whilst ESW have indicated that it should be feasible to complete the Sizewell transfer main by the end of 2026, it is assumed for the purposes of assessment that the desalination plant is operational throughout the construction period until it is no longer required and therefore is also required to deliver the 4Ml/day peak potable water demand associated with main construction. This is to allow for the unlikely event of ESW's most pessimistic, worst case delivery programme for the Sizewell transfer main. The desalination plant would be decommissioned once the transfer main is fully available, prior to the commencement of operation of the proposed nuclear power station.

3.2.23 SZC Co. has consulted on its proposals for temporary desalination (the Proposed Change 19). The consultation was held between 3 August and 27 August 2021. Details of the consultation carried out, and how SZC Co. had regard to the feedback, are provided in the **Consultation Report Fourth Addendum** (Doc Ref. 5.1 Ad4 Ch) that accompanies the change request. In summary, none of the consultation responses have necessitated any changes to the desalination proposals. However, the proposed intake pipe has been increased in length from approximately 380m to 485m, measured from the temporary Hard Coastal Defence Feature (HCDF). The proposed outfall pipe has also been increased in length from approximately 200m to 385m from the same reference point. This is proposed in response to concerns over the localised environmental effects of the proposed plant by accessing deeper water that would improve dispersion of the brine water discharge within the water column whilst also minimising recirculation between the two pipes.

3.2.24 Construction of the desalination plant would take approximately 4-6 months and can only commence once site clearance works are complete on the site of the future power station (the main platform). It is therefore assumed that for the first 9-12 months of construction, potable water will need to be imported by road via water tanker truck. The number of tanker deliveries is likely to rise gradually during this period to approximately 40 deliveries per day. The capped HGV limits already established for the Project would remain unchanged.

3.2.25 Once constructed, the modular desalination plant would initially be capable of producing up to approximately 2,600m^3 of potable water per day. In the event that the water transfer main is not complete by the fourth year of construction, additional modules would be added to the plant to create the ability to produce up to approximately 4,000m^3 of potable water per day. This provides a realistic worst-case for assessment purposes.

3.2.26 The desalination process comprises the following core components:

- Onshore desalination and associated equipment.
- Seawater intake pipe and associated headworks.
- Brine water outfall pipe and associated diffusers.

i. Onshore desalination and associated equipment

3.2.27 The assumed technology is Sea Water Reverse Osmosis (SWRO) desalination. The plant would consist of up to approximately nine containerised plant modules with associated chlorination units, equipment and other tanks. The plant is assumed to operate up to 24 hours per day.

3.2.28 Plant would be delivered by road and is unlikely to comprise any Abnormal Indivisible Loads (AILs). Additional HGV movements associated with any AILs and water tanker trucks would be within the already proposed HGV daily limit established for the Project for the early years.

3.2.29 The plant would initially be located in the main platform area (see **Volume 2, Figure 3.1** of this **Fourth ES Addendum**). The height of the equipment is assumed to be up to 10m above ground level. Mobile crane units and a directional drilling rig are likely to be required to install plant and drill the intake and outfall tunnels. The rig is assumed to be temporarily sheet-piled into the ground for stability.

3.2.30 Once construction activity in the main platform area reaches a point where the desalination plant becomes a physical constraint, and if the Sizewell transfer main is not already delivered by that time, the desalination plant would be relocated to the temporary construction area (TCA) (see

Volume 2, Figure 3.2 of this **Fourth ES Addendum**). Any such relocation would be phased to coincide with a period of relatively low potable water demand. In order to maintain continuity of supply, the desalination plant would be installed and commissioned at the relocation site before the existing plant on the main platform is fully decommissioned. It is assumed that any such relocation would occur in approximately Year 4 of construction.

3.2.31 **Volume 2, Figures 3.3** to **3.7** of this **Fourth ES Addendum** provide the update construction parameter plan and indicative masterplans to show the two proposed locations of the temporary desalination plant.

3.2.32 On-site diesel generators are assumed to be necessary to provide up to approximately 1.6 MVA of electricity for the plant located in the main platform. Once the construction site's permanent electricity connection is installed and operational, the desalination plant would be operated from the fixed supply and diesel generators would be decommissioned. It is assumed that the desalination plant located in the temporary construction area would not require diesel generators.

3.2.33 Seawater contains dissolved solids other than salt and other minerals, which are also removed as part of the desalination process. This non-hazardous slurry material would be dried to produce a cake (25% dry solids) which would require off-site disposal. At peak desalination, approximately one HGV-load of this material would be generated and exported per day, which would remain within the assumed daily HGV limit.

ii. Seawater intake pipe and associated headworks

3.2.34 A desalination plant typically converts 40% of the seawater it abstracts into fresh water. Therefore, the seawater intake pipe will be sized to abstract up to 10Ml of water per day. This requires a small-bore pipeline (between approximately 250-350mm diameter).

3.2.35 The pipe would extend approximately 485m seaward from the temporary Hard Coastal Defence Feature (HCDF) in a minimum 5m depth of water at lowest astronomical tide (LAT) conditions. The indicative location of the pipe is shown in **Volume 2, Figures 3.1** and **3.2** of this **Fourth ES Addendum.**

3.2.36 The pipe would be installed under the beach and under the seabed using a directional drilling or other trenchless methodology. It would be launched from the landward side of both the temporary HCDF and the haul road, using a drilling rig or similar as described above.

3.2.37 The pipe would be at sufficient depth to ensure no risk of exposure during or following storms. The pipe would therefore not be present on, or

interact with, the surface of the beach or seabed except at the drilling exit site (where a headworks would be located as described below).

3.2.38 Bentonite is assumed to be used in the drilling process; a bentonite recovery system would be used during drilling to minimise emissions. Due to the requirement to ensure a stable borehole whilst drilling, it is assumed drilling would require continuous working (24 hours per day).

3.2.39 The intake pipe would hydraulically connect directly to a wet well chamber landward of the temporary HCDF and the haul road, which would be sufficiently deep to allow it to naturally fill with seawater under gravity. The exact water level would rise and fall with the tide but the well would be sufficiently deep to ensure it is constantly wet. The well shaft would be constructed by caisson, cofferdam or similar to isolate the well from surrounding groundwater. Once operational, seawater would then be pumped out of the well and into the desalination plant. As these pumps would be located at depth they would not give rise to noise concerns.

3.2.40 To prevent ingress of glass eels and other early life-stages of fish and larger invertebrates the seawater intake would consist of a Passive Wedge-Wire Cylinder (PWWC) screen with a mesh size of approximately 2mm. The screen would be approximately 60cm in diameter and the headworks would be approximately 1.6m in length. The headworks would be positioned to reduce the tidal forcing against the screens and minimise approach velocities where possible. The flow velocities within the 250-350mm diameter intake pipeline would be between ca. 1.1-1.7m/s.

3.2.41 The intake would be located underwater approximately 1m above the seabed. A temporary hazard marker would be located directly above.

3.2.42 The intake screen and pipework will be maintained by periodic cleaning using a compressed air cleaning system. Periodic shock chlorination within the headworks would also be applied to prevent biofouling. Chlorine dosing would be flow controlled and angled inwards to avoid chlorine emissions to the environment. Abstracted water would be dechlorinated prior to the Sea Water Reverse Osmosis membranes.

3.2.43 Localised dredging, in the form of backhoe dredging of similar, is assumed to be necessary in the immediate area surrounding the headwork.

3.2.44 Once the headworks are constructed, scour protection is assumed to be placed over them to manage the effects of seabed level changes. A small area of concrete mattress is assumed to mitigate scour immediately around the section of intake pipe connecting the drilled tunnel to the headworks.

3.2.45 3.1.29 The fish return tunnels and associated headworks are not required until the operation of the power station and use of the seawater intake pipe would cease before they begin any commissioning tests towards the end of the construction period.

3.2.46 The seawater intake headworks would be decommissioned and removed once the transfer main is fully available. The buried intake pipeline would be grouted (or similar), capped and would remain in-situ. A jack-up barge is assumed to be necessary during both construction and decommissioning of the headworks and associated infrastructure.

iii. Brine water outfall pipe and associated diffusers

3.2.47 A desalination plant typically converts 40% of the seawater it abstracts into fresh water as stated previously. Therefore, the brine water outfall pipe will be sized to discharge up to 6Ml of water per day. This again requires a small-bore pipe (approximately 250-350mm diameter).

3.2.48 The pipe would extend approximately 385m seaward from the temporary Hard Coastal Defence Feature (HCDF) in a minimum 4.5m depth of water at LAT. The indicative location of the pipe is shown in **Volume 2, Figures 3.1** and **3.2** of this **Fourth ES Addendum**.

3.2.49 The outfall pipe would also be installed under the beach and under the seabed using directional drilling or other trenchless methodology as per the description for the intake pipe, including use of bentonite recovery.

3.2.50 The outfall pipe would be fitted with diffusers, in the form of a series of nozzles at the seaward end to help disperse the brine water. These are likely to be based on a ‘duck bill’ design to prevent intrusion of sand, sediment, saltwater and marine growth. Periodic inspection and cleaning of the outfall diffusers will be required to ensure correct operation. A temporary hazard marker would be located directly above.

3.2.51 Localised dredging, in the form of backhoe dredging of similar, is assumed to be necessary in the immediate area surrounding the headwork.

3.2.52 The brine water will be balanced and mixed on the construction site as part of the desalination process. It will then be stored in a storage tank adjacent to the desalination plant and pumped through the outfall pipe in a controlled manner on a continuous basis (24-hours per day).

3.2.53 Water to be discharged via the outfall pipe would gravitate when tidal conditions allow with pumping to assist across the tidal cycle. It is assumed that the pumps would be located within the desalination plant and would be above-ground and enclosed to provide acoustic attenuation.

3.2.54 The seawater outfall headworks would be decommissioned and removed once the transfer main is fully available. The buried intake pipeline would be grouted (or similar), capped and would remain in-situ. A jack-up barge is assumed to be necessary during both construction and decommissioning of the headworks and associated infrastructure.

3.3 Review of Environmental Assessments

3.3.1 A review of whether the Proposed Change 19 introduces new or materially different likely significant environmental effects has been undertaken by EIA specialists across all technical assessments reported within **Volume 2** of the **ES** [APP-178 to APP-347]. This is summarised within **Table 3.1**. The Proposed Change 19 does not change the environmental assessments reported within **Volumes 3** to **9** of the **ES**. Updates to **Volume 10** of the **ES** are considered within **section 3.13** of this chapter.

Table 3.1: Review of environmental assessments

Technical Assessment	Review of whether new or materially different likely signifcant effects would arise as a result of Proposed Change 19
Conventional Waste and Material Resources With reference to **Volume 2, Chapter 8** of the **ES** [APP-193], as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	Proposed Change 19 does not alter the baseline. The materials required for the construction of the desalination plant form less than 0.1% of the material requirements set out within the **Materials Management Strategy** [AS-202], therefore, there is also no change to the material resources assessment. However, the desalination plant is anticipated to generate small amounts of additional non-hazardous waste. Therefore, an updated assessment on the capacity of waste management facilities has been provided within **section 3.4** below.

Technical Assessment	Review of whether new or materially different likely signifcant effects would arise as a result of Proposed Change 19
Socio-economics With reference to **Volume 2, Chapter 9** of the **ES** [APP-195], as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	Proposed Change 19 does not alter the baseline nor the workforce estimates during construction or operation. Therefore, the proposed change results in no change to the conclusions of the assessments reported within **Volume 2, Chapter 9** of the **ES** [APP-195], as updated by the subsequent **ES Addenda** (AS-181 and **Volume 1, Chapter 2** of this **Fourth ES Addendum**).
Transport With reference to **Volume 2, Chapter 10** of the **ES** [APP-198], , as updated by the subsequent **ES Addenda** (AS-181, REP5-064, REP5-069 and **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	The HGV deliveries associated with the water tanker trucks during the early stages of Sizewell C construction, waste removal and the construction and demolition of the temporary desalination plant would remain within the capped HGV limits for the Sizewell C Project. Furthermore, no additional Abnormal Indivisible Loads (AILs) are likely required as a result of this change and if they are required, they would also remain within the capped HGV limits. Therefore, there would be no change to the construction traffic flows. As a result, there would be no change to the conclusions of the assessment reported within **Volume 1, Chapter 2** of this **Fourth ES Addendum**.
Noise and Vibration With reference to **Volume 2, Chapter 11** of the **ES** [APP-202], as updated by the subsequent **ES Addenda** (AS-181, REP5-064 and **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	Proposed Change 19 would not alter the baseline, however, it would introduce additional construction plant and activities within the main development site. Therefore, an updated assessment has been provided within **section 3.5** of this chapter.

Technical Assessment	Review of whether new or materially different likely signifcant effects would arise as a result of Proposed Change 19
Air Quality With reference to **Volume 2, Chapter 12** of the ES [APP-212], as updated by the subsequent **ES Addenda** (AS-181, REP5-064, and **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	Proposed Change 19 would not alter the baseline, however, it would introduce additional on-site diesel generators within the main development site. Therefore, an updated assessment has been provided within **section 3.6** of this chapter.
Landscape and Visual With reference to **Volume 2, Chapter 13** of the **ES** [APP-216], as updated by the subsequent **ES Addenda** (AS-181, REP5-064 and **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	The height of the equipment associated with the temporary desalination plant would be up to 10m above ground level, which remains significantly below the maximum construction height parameters established for the relevant zones within the construction site that it is proposed to be located within. As a result, the Proposed Change 19 would not introduce new landscape or visual receptors that would alter the baseline recorded or give rise to any discernible change in the landscape and visual effects to those set out within the assessments at **Volume 2, Chapter 13** of the **ES** [APP-216] as updated by the subsequent **ES Addenda** (AS-181, REP5-064] and **Volume 1, Chapter 2** of this **Fourth ES Addendum**.

Technical Assessment	Review of whether new or materially different likely signifcant effects would arise as a result of Proposed Change 19
Terrestrial Ecology and Ornithology With reference to **Volume 2, Chapter 14** of the **ES** [AS-033], as updated by the subsequent **ES Addenda** (AS-181, REP5-064, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	The temporary desalination plant has been sited within areas already identified as construction areas and has been located away from the site boundaries, including noise sensitive receptors, such as the Sizewell Marshes SSSI and Sizewell beach. It is assumed that connecting pipework between the proposed location of the desalination plant within the temporary construction area and the marine infrastructure would run across the SSSI crossing above the soffit level of the bridge. The proposed change would not require additional land-take nor would it result in new or materially different significant noise and air quality effects, as described within **sections 3.5** and **3.6** of this chapter. There would also be no change with regards to impacts on geology and land quality groundwater and surface water, as explained in the rows below. In relation to marine birds, the proposals will lead to very localised and short term disturbance during construction and very local marine water quality changes during construction with consequent impacts on fish (see **Sections 3.8** and **3.9** below). The resultant effects on birds are considered to be within the envelope of effects already assesed for birds in the ES. Proposed Change 19 would therefore not alter the baseline nor give rise to any different terrestrial ecology or ornithology effects to those set out within **Volume 2, Chapter 14** of the **ES** [AS-033], as updated by the subsequent **ES Addenda** (AS-181, REP5-064, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).

Technical Assessment	Review of whether new or materially different likely signifcant effects would arise as a result of Proposed Change 19
Amenity and Recreation With reference to **Volume 2, Chapter 15** of the **ES** [APP-267] as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	The temporary desalination plant has been located away from the Sizewell beach, and the seawater intake and brine outfall pipes would be installed at depth under the beach using a directional drilling or other trenchless methodology, and therefore would not affect the Coast Path. There is no material change to the assessment conclusions of transport, noise and vibration (see **section 3.5** of this chapter), air quality (see **section 3.6** of this chapter) and landscape and visual effects. Proposed Change 19 would therefore not alter the baseline nor give rise to any discernible change in the amenity and recreation impacts, compared to those set out within **Volume 2, Chapter 15** of the **ES** [APP-267], as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).
Terrestrial Historic Environment With reference to **Volume 2, Chapter 16** of the **ES** [APP-272], as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	With no material change to the overall land-take of the proposed development, nor the significance of the noise and vibration (see **section 3.5** of this chapter), and landscape and visual effects in the assessment, Proposed Change 19 would not alter the baseline nor give rise to any discernible change in the magnitude of disturbance of heritage assets or change to setting to those set out within the assessments at **Volume 2, Chapter 16** of the **ES** [APP-272], as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**.

Technical Assessment	Review of whether new or materially different likely signifcant effects would arise as a result of Proposed Change 19
Soils and Agriculture With reference to **Volume 2, Chapter 17** of the **ES** [APP-277], as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	Proposed Change 19 does not require additional agricultural land to be included within the site boundary. Therefore, Proposed Change 19 would not alter the baseline nor give rise to any discernible change in the soils and agriculture impacts (loss of best and most versatile land or loss/ disruption to land under agricultural use) to those set out within **Volume 2, Chapter 17** of the **ES** [APP-277], as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).
Geology and Land Quality With reference to **Volume 2, Chapter 18** of the **ES** [APP-280] as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	Proposed Change 19 would not alter the baseline conditions for geology and land quality assessment. Whilst the temporary desalination plant would require additional tunnel boring and the use and storage of chemicals on-site, contamination risks from these activities, and the management of excavated materials were already considered within **Volume 2, Chapter 18** of the **ES** [APP-280]. Therefore, there is no change to the conceptual site model for the main development site and no change to the conclusions of the assessment presented within **Volume 2, Chapter 18** of the **ES** [APP-280], as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).

Technical Assessment	Review of whether new or materially different likely signifcant effects would arise as a result of Proposed Change 19
Groundwater and Surface Water With reference to **Volume 2, Chapter 19** of the **ES** [APP-297] as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	Proposed Change 19 would not alter the baseline nor give rise to any discernible change in the groundwater and surface water impacts to those set out within the assessments at **Volume 2, Chapter 19** of the **ES** [APP-297], as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**). The assessment of flood risk already considered impacts to and from construction activities within the area for the desalination plant. Therefore, there is no material change to drainage proposals, flood risk or water quality impacts identified within the **ES**.
Coastal Geomorphology and Hydrodynamics With reference to **Volume 2, Chapter 20** of the **ES** [APP-311] as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	Proposed Change 19 would not alter the baseline conditions in the marine environment, however, it introduces new infrastructure and construction activities within the marine environment. Therefore, updated marine environmental assessments have been provided within **sections 3.7** to **3.11** of this chapter.
Marine Water Quality and Sediments With reference to **Volume 2, Chapter 21** of the **ES** [APP-314] as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	
Marine Ecology and Fisheries With reference to **Volume 2, Chapter 22** of the **ES** [APP-317], as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	

Technical Assessment	Review of whether new or materially different likely signifcant effects would arise as a result of Proposed Change 19
Marine Historic Environment With reference to **Volume 2, Chapter 23** of the **ES** [APP-334], as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	
Marine Navigation With reference to **Volume 2, Chapter 24** of the **ES** [APP-337], as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	
Radiological Considerations With reference to **Volume 2, Chapter 25** of the **ES** [APP-340], as updated by **Volume 1, Chapter 2** of this **Fourth ES Addendum**.	Proposed Change 19 does not include works to any facilities associated with activities or processes which involve the handling or the production of radioactive items or material. Therefore, there is no change to the baseline or assessment presented within **Volume 2, Chapter 25** of the **ES** [APP-340].

Technical Assessment	Review of whether new or materially different likely signifcant effects would arise as a result of Proposed Change 19
Climate Change With reference to **Volume 2, Chapter 26** of the **ES** [APP-342] as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	The materials required for the construction of the desalination plant form less than 0.1% of the material requirements set out within the **Materials Management Strategy** [AS-202]. Diesel generators would be used for a short period of time, before the desalination plant is connected to the main electrical supply. The diesel generators would be removed at the earliest opportunity and before any relocation of the desalination plant to the temporary construction area. Furthermore, the additional waste generated from the desalination plant forms less than 2% of all construction waste based on the estimates set out within **section 3.4**. Therefore, whilst Proposed Change 19 will introduce some changes to the quantities of resources required or waste generated as a result of the proposed development, these changes are not considered to be material. As such, the Proposed Change 19 is not considered to change the conclusions of the greenhouse gas emissions (GHG) assessment for the proposed development, namely that the Sizewell C Project will provide a significant contribution to reducing GHG emissions from electricity generation in the long term, and that Sizewell C will not affect the ability of the Government to meet its relevant carbon budgets. Furthermore, there is no change to the climate change resilience of the proposed development or in-combination climate impacts, as described within **Volume 2, Chapter 26** of the **ES** [APP-342] and updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).

Technical Assessment	Review of whether new or materially different likely signifcant effects would arise as a result of Proposed Change 19
Major Accidents and Disasters With reference to **Volume 2, Chapter 27** of the **ES** [APP-344] as updated by the subsequent **ES Addenda** (AS-181, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	Proposed Change 19 would not alter the baseline conditions, however, the operation of a temporary desalination plant introduces additional accident hazards on site. Therefore, an update to the assessment is provided within **section 3.12** of this chapter.
Health and Wellbeing With reference to **Volume 2, Chapter 28** of the **ES** [APP-346] as updated by the subsequent **ES Addenda** (AS-181, REP6-017, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).	As no discernible change to the baseline or the conclusions reached in respect of the assessments of socio-economics, transport, noise and vibration (see **section 3.5**), air quality (see **section 3.6**), and radiological effects have been identified, the assessment of effects on health and wellbeing would also remain as set out within **Volume 2, Chapter 28** of the **ES** [APP-346] as updated by the subsequent **ES Addenda** (AS-181, REP6-017, **Volume 1, Chapter 2** of this **Fourth ES Addendum**).

3.3.2 The review concluded that the Proposed Change 19 could have the potential to affect the following assessments reported within **Volume 2** of the **ES** [APP-178 to APP-347]:

- Conventional waste and material resources;
- Noise and vibration;
- Air quality;
- Coastal geomorphology and hydrodynamics;
- Marine water quality and sediments;
- Marine ecology and fisheries;
- Marine historic environment;
- Marine navigation; and

- Major accidents and disasters.

3.3.3 Further consideration was therefore required and is presented in **sections 3.5** to **3.12** below. The Proposed Change 19 does not affect any other environmental assessment topic areas or receptors identified in **Volume 2** of the **ES**.

3.4 Conventional Waste and Material Resources

a) Introduction

3.4.1 This section provides an addendum to the conventional waste and material resources assessment resulting from the Proposed Change 19, with reference to the following documents:

- **Volume 2, Chapter 8** of the **ES** [APP-193], and
- **Volume 1, Chapter 2** of the **First ES Addendum** [AS-181].

b) Updated assessment

3.4.2 The operation of the desalination plant is estimated to generate up to 14 tonnes of dewatered sludge cake per day, 20m^3 of Clean In Place (CIP) wastewater every 3 months and very limited amounts of other wastes (such as waste membranes and cartridge filters), which will require off-site disposal. Tunnel boring arisings would be managed in line with the **Materials Management Strategy** [AS-202] and re-used within landscaping on site following treatment.

3.4.3 On a precautionary worst-case basis, assuming operation at full capacity over a 57-month period, these additional wastes would increase the total volume of non-hazardous waste from the construction period by approximately 24,000t. Hence, the total volume of non-hazardous waste from the Sizewell C Project would increase from 109,000t set out in the **First ES Addendum** [AS-181] to 133,000t. As per the **First ES Addendum**, this volume of waste would constitute greater than 1% but less than 5% of the remaining landfill capacity for non-hazardous wastes within 100km of the main development site boundary. The magnitude of effect would, therefore, remain minor adverse and **not significant**.

3.4.4 There is no change to the inert and hazardous waste assessments.

3.5 Noise and Vibration

a) Introduction

3.5.1 This section provides an addendum to the noise and vibration assessment resulting from the Proposed Change 19, with reference to the following documents:

- **Volume 2, Chapter 11** of the **ES** [APP-202]; and
- **Volume 2, Appendix 11B** of the **ES** [APP-204].

b) Relevant Changes

3.5.2 The Proposed Change 19 has the potential to alter the predicted noise levels during both its construction and operational use. The two potential locations of the proposed desalination plant are sufficiently far from any off-site receptor that the effects of vibration will be negligible and they are therefore not considered further.

3.5.3 During the construction of the Proposed Change 19, the directional drilling is likely to give rise to the highest noise level; the remainder of the ancillary construction activities, which are likely to include cranes and heavy goods vehicles, will not give rise to noise levels that exceed that assessed in relation to the main construction activities.

3.5.4 It is expected that the noise generated by the directional drilling system will be similar to that previously assessed in the submitted construction noise assessment, listed as Item 51 in **Annex 11B/A** in **Volume 2, Appendix 11B** of the **ES** [APP-204]. For ease of reference, this sets out a sound power level of 106.6dB L_{WA}.

3.5.5 It is understood that the Proposed Change 19 will be powered using diesel generators when positioned in its initial location, and will be powered from a mains connection once relocated within the TCA. In addition, above ground pumps may be required at both locations for the return brine discharge. Pumps will also be required associated with the seawater intake but these are assumed to be at depth within the wet well and/or intake pipe and would therefore not be a source of noise at surface. The sources likely to generate noise during the operation of the Proposed Change 19 are therefore the diesel generator plant and outfall pump(s) in its initial location, and just the outfall pump(s) once the system is relocated to the TCA.

3.5.6 In the absence of noise emission data for the Proposed Change 19, the following precautionary source noise levels are assumed as typical for the proposed operations:

- 2 no. diesel generators: 90dB L_{WA} each, based on Item 23 in Table C.8 in BS5228-1: 2009+A1: 2014 (Ref. 1) in its initial location only;
- 10 no. pumps: 96dB L_{WA} each, based on Item 40 in Table C.5 in BS5228-1: 2009+A1: 2014, in both of the proposed locations.

c) Baseline

3.5.7 There are no changes to the baseline as a result of Proposed Change 19.

d) Environmental Design and Mitigation

3.5.8 The Proposed Change 19 includes the following mitigation:

- Noise-generating plant will all be either containerised or within noise hoarding or similar.
- Seawater intake pumps will be within the wet well and therefore inaudible at the surface.

3.5.9 The above measures have been secured through Requirement 8 of the **draft DCO** (Doc Ref. 3.1(H) Ch).

3.5.10 However, to consider a worst-case, no reductions have been applied to the sound levels set out in **section 3.5 b).**

e) Assessment of Effects

i. Construction of the temporary desalination plant

3.5.11 The effect of directional drilling from the two locations associated with the Proposed Change 19 has been considered in terms of whether the previously-assessed construction noise levels would be affected.

3.5.12 On the basis that the directional drilling may be undertaken 24 hours a day, the noise levels at the receptors around the main development site have been calculated to determine whether the previously-assessed construction noise levels are likely to change.

3.5.13 The effect of the directional drilling has found that:

- during the daytime, the previously-assessed construction noise levels are not predicted to change;

- during the night-time, the previously-assessed construction noise levels at the receptor Rosery Cottages (Receptor 19 on **Figure 11.1** in **Volume 2, Chapter 11** of the **ES** [APP-211]), are predicted to increase by up to 0.4dB;

- the predicted changes in the previously-assessed night-time construction noise levels at all except three of the remaining receptors are predicted not to change, with predicted changes of up to +0.1dB at four receptors.

3.5.14 None of these changes will result in a change to the previous assessments, in terms of the magnitudes of impact, the effect categories and the significance of effects.

3.5.15 The effect of the construction of the Proposed Change 19 will not alter the findings of the assessment set out in **Volume 2, Chapter 11** of the **ES** [APP-202].

ii. Operation of the temporary desalination plant

3.5.16 The operation of the Proposed Change 19 has been considered for both of its proposed locations, on the basis of it being powered by 2 no. diesel generators in its initial location, and by a connection to the electricity grid in its TCA location. In both locations, the pumps set out in **section 3.5 b)** are included.

3.5.17 The effect of the Proposed Change 19 in its initial location has found that:

- during the daytime, the previously-assessed construction noise levels are not predicted to change;

- during the night-time, the previously-assessed construction noise levels at the receptor Rosery Cottages (Receptor 19 on **Figure 11.1** in **Volume 2, Chapter 11** of the **ES** [APP-211]), are predicted to increase by 0.5dB;

- the predicted changes in the previously-assessed night-time construction noise levels at all except ten of the remaining receptors are predicted to be 0dB, with predicted changes of +0.2dB at three receptors and +0.1dB at seven receptors.

3.5.18 None of these changes will result in a change to the previous assessments, in terms of the magnitudes of impact, the effect categories and the significance of effects.

3.5.19 The effect of the Proposed Change 19 in its location within the TCA has found that:

- during the daytime, the previously-assessed construction noise levels are not expected to change;
- during the night-time, the predicted changes in the previously-assessed construction noise levels at all except 15 receptors are predicted to not change, with the predicted changes of +0.2dB at three receptors and +0.1dB at 12 receptors.

3.5.20 None of these changes will result in a change to the previous assessments, in terms of the magnitudes of impact, the effect categories and the significance of effects.

3.5.21 The effect of the operation of the Proposed Change 19 would not alter the findings of the assessment set out in **Volume 2, Chapter 11** of the **ES** [APP-202], irrespective of whether it is located in its initial position, or at its proposed location within the TCA.

3.5.22 The outcomes are achieved even though the pumps in particular are likely to be quieter than assumed in this assessment, due to their containerisation.

f) Additional Mitigation and Residual Effects

3.5.23 No further mitigation measures are considered necessary and the residual effects will remain as set out in **Volume 2, Chapter 11** of the **ES** [APP-202].

3.6 Air Quality

a) Introduction

3.6.1 This section provides an addendum to the air quality assessment resulting from the Proposed Change 19, with reference to the following documents:

- **Volume 2, Chapter 12** of the **ES** [APP-212]; and
- **Volume 1, Chapter 2** of the **First ES Addendum** [AS-181].

b) Relevant Changes

3.6.2 The Proposed Change 19 is not anticipated to require additional construction works beyond those already assessed, however in the initial phase of works it will result in emissions to air through HGV deliveries.

The HGV movements are not anticipated to extend beyond those already assessed for the main development site.

3.6.3 The operation of the desalination plant would require the use of temporary diesel generators of circa 1.6 MW output in the initial location, until the construction site's permanent electricity connection is installed and operational.

c) Baseline

3.6.4 There are no changes to the baseline as a result of Proposed Change 19.

d) Environmental Design and Mitigation

3.6.5 The temporary diesel generators would be subject to the same controls via an Environmental Permit (MCPD or aggregated Part A permit) as described within the **Volume 2, Chapter 12** of the **ES** [APP-212]. Other mitigation measures outlined in the **ES** would also apply, including avoiding siting generators close to sensitive boundaries or receptors (>200m.

3.7 Coastal Geomorphology and Hydrodynamics

a) Introduction

3.7.1 This section provides an addendum to the coastal geomorphology and hydrodynamics assessment resulting from the Proposed Change 19, with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 20** of the **ES** [APP-311];
- **Volume 2, Appendix 20A** of the **ES** [APP-312]; and
- **Figure 20.1 in Volume 2, Chapter 20** of the **ES** [APP-313].

b) Relevant changes

3.7.2 A description of the proposed change is provided within **Section 3.2** of this chapter. The proposed changes of relevance to the assessment of coastal geomorphology and hydrodynamics include:

- The installation and presence/usage and removal of intake and outfall heads for a desalination plant in the nearshore zone, seaward of the outer longshore bar crest.

3.7.3 All other changes due to the proposed desalination plant described within **Section 3.2** of this chapter do not affect the assessment of effects

for coastal geomorphology and hydrodynamics and, therefore, have not been considered further.

3.7.4 The design specifications of the desalination plant are detailed in **Section 3.2** of this chapter. The design specification has adhered as closely as possible to the works already assessed for Coastal Geomorphology impacts in **Volume 2, Chapter 20** of the **ES** [APP-311] for the construction and operation of the nearshore outfalls (i.e., the Combined Drainage Outfall (CDO) and the Fish Recovery and Return (FRR) outfalls). **Table 3.2** compares the design details relevant to the coastal geomorphology receptor of the nearshore outfalls assessed in **Volume 2, Chapter 20** of the **ES** [APP-311], as updated by subsequent **First ES Addendum** [AS-181], and the desalination intake and outfall.

3.7.5 As described in **Section 3.2**, the outfall head would be approximately 385 m seaward of the HCDF and assumed to be located on the seaward flank of the outer longshore bar; the intake head would be positioned approximately 100m further seaward. For the assessment, the outfall location is assumed to be within the bar feature as a worst case for impacts on the longshore bars. The intake head is not considered far enough offshore to lie potentially within the circulatory flow maintaining the Sizewell-Dunwich Bank (as discussed in **Volume 2, Appendix 20A** of the **ES** [APP-312]. Therefore, the heads are not considered to have a pathway to impact on the bank.

3.7.6 The impacts of drilling and capital dredge requirements for installation are assumed to be similar to those of the FRR, based on similar location, size of headworks and methods.

3.7.7 For assessment purposes, the head dimensions are assumed to be equal to those assessed for the FRR (3m wide x 3m long x 2.5m high blocks) for the calculation of scour. However, the actual dimensions are likely to be smaller, for example the PWWC intake screen is 60 cm in diameter, 1.6 m in length and 1 m off the seabed.

3.7.8 The intake and outfall heads will be removed using similar methods (jack-up barge) to those required for installation.

Table 3.2: Specifications of desalination plant intake/outfall activities and infrastructure compared to the nearshore outfalls assessed in Volume 2, Chapter 20 of the ES [APP-311], as updated by First ES Addendum [AS-181].

Parameter	DCO Application (nearshore outfalls)	Desalination Plant (Proposed Change 19)	Element of Coastal Geomorphology Receptor
Pipeline construction	Horizontal Directional Drilling from behind temporary	Horizontal Directional Drilling from behind temporary	None

Parameter	DCO Application (nearshore outfalls)	Desalination Plant (Proposed Change 19)	Element of Coastal Geomorphology Receptor
	defence line to seaward of the outer bar	defence line to seaward of the outer bar	
Dredging	Capital dredge of 1,845m^3 assumed to be from the seaward flank of the outer longshore bar as a worst case, with local disposal of dredge spoil (500m distant)	Capital dredge of 1,845m^3 assumed to be from the seaward flank of the outer longshore bar as a worst case, with local disposal of dredge spoil (500m distant)	Outer longshore bar
Head location	Seaward of the outer longshore bar crest	Seaward of the outer longshore bar crest	Outer longshore bar
Installation and removal methods	Jack-up barge	Jack-up barge	Outer longshore bar
Head size	3m x 3m x 2.5m	3m x 3m x 2.5m	Outer longshore bar
Intake	n/a	<0.116m^3/s	Outer longshore bar
Discharge	0.3m^3/s through a 0.8 m diameter aperture	<0.069m^3/s through a 0.16 m diameter aperture	Outer longshore bar
Presence	Permanent – present during all Sizewell C phases	Temporary – present during only Sizewell C construction phase	Outer longshore bar

c) Updated assessment

i. Baseline

3.7.9 The proposed changes do not change the existing and future baseline for Coastal Geomorphology as described in **Volume 2, Chapter 20** of the **ES** [APP-311], as updated by the **First ES Addendum** [AS-181].

ii. Environmental Design and Mitigation

3.7.10 The Proposed Change 19 embeds (primary) mitigation of the impacts on Coastal Geomorphology by:

- Using the Horizontal Direct Drilling (HDD) method for both pipelines under the beach and intertidal such that the intake and outfall heads are the only features in the marine environment;
- Locating the heads seaward of the outer longshore bar and beyond the main areas of longshore transport such that they do not interact with either the major physical features or marine processes of the geomorphology receptor.

- A small area of concrete mattress may be required to mitigate scour around the pipe connecting the drilled tunnel to each head, which would limit the development of scour at these locations.

3.7.11 The above measures have been secured through Requirement 8 of the **draft DCO** (Doc Ref. 3.1(H) Ch).

3.7.12 No further mitigation measures are proposed as a result of the proposed change, above those stated in **Volume 2, Chapter 20** of the **ES** [APP-311] and updated by the **First ES Addendum** [AS-181].

iii. Assessment of Effects

3.7.13 This section details the effects associated with construction and use of the desalination plant. The summary table at the beginning of each assessment is for the worst-case effect on any coastal geomorphology receptor, for a direct comparison with the effects presented within **Volume 2, Chapter 20** of the **ES** [APP-311], as updated by the **First ES Addendum** [AS-181].

3.7.14 Effects are described for the installation, usage, and removal of the desalination plant during the construction phase of the proposed development.

3.7.15 The coastal geomorphology receptor of the Greater Sizewell Bay (GSB) has five morphological elements (see **Figure 20.1** in **Volume 2, Chapter 20** of the **ES** [APP-313]), which may interact directly or indirectly with one another:

- The shoreline/beach (which encompasses sections fronting the Minsmere to Walberswick Heaths and Marshes SAC and the Minsmere to Walberswick SPA), containing UK priority Biodiversity Action Plan's Coastal Vegetated Shingle Habitat (Annual vegetation of drift lines, Annex I habitat 1210) and the potential for nesting Little Terns;
- Two (inner and outer) longshore bars;
- The Sizewell - Dunwich Sandbank; and
- The Coralline Crag outcrops (at Thorpeness and seaward of the Sizewell-Dunwich Sandbank).

3.7.16 Due to uncertainty in the precise location of the heads in relation to the bar (which may migrate over the period of desalination plant usage), effects have been assessed on a precautionary basis assuming the

impacts of the outfall occur at the bar crest, and scour calculations are derived for tidal flow speeds seaward of the outer longshore bar.

Pressures on coastal geomorphology receptors

3.7.17 As the desalination plant is not present during the operational phase, only pressures during the construction phase have been assessed.

3.7.18 **Table 3.3** details the pressures associated with the installation, use and removal of the desalination plant.

Table 3.3: Pressures on Coastal Geomorphology associated with the desalination intake and outfall activities during the construction phase.

Pressure	Activity resulting in Pressure.	Potential Receptors	Justification for assessment
Changes to tidal flow	(i) Dredging (ii) Dredge disposal (iii) Construction Plant (iv) Presence of heads (v) Intake/outfall flows	No impact to Coralline Crag outcrops No impact to Beach (located outside of the outer bars) Localised changes to longshore tidal streams maintaining the bars No impact to Sizewell Bank	All listed activities affect water depth (e.g., dredging) or place obstacles within the flow.
Changes to wave propagation shoreward	(i) Dredging (ii) Dredge disposal (iii) Construction Plant (iv) Presence of heads (v) Intake/outfall flows	No impact to Coralline Crag outcrops No impact to Beach (located outside of the outer bars) Localised changes to wave shoaling over outer bar No impact to Sizewell Bank (waves propagate landward)	All listed activities affect water depth (dredge) or place obstacles within wave field (though larger waves are unlikely to be significantly affected by obstructions of this magnitude).

Pressure	Activity resulting in Pressure.	Potential Receptors	Justification for assessment
Changes in suspended sediments.	(i) Dredging (ii) Dredge disposal (iii) Drilling (iv) Construction Plant (v) Presence of heads	No impact to Coralline Crag outcrops No impact to Beach Localised changes to sedimentation over outer bar No impact to Sizewell Bank	All listed activities would generate localised small and temporary plumes either directly or via scour and suspension of sediments due to flow diversion (though suspension of sand-sized sediments in quiescent working conditions would be a very small fraction of sediment budgets and sediments would rapidly settle locally).
Sedimentation rate changes.	(i) Dredging (ii) Dredge disposal (iii) Drilling (iv) Construction Plant (v) Presence of heads	No impact to Coralline Crag outcrops No impact to Beach Localised changes to sedimentation over outer bar No impact to Sizewell Bank	All listed activities would affect sedimentation either locally (due to scour or flow deviation) and/or from plumes. Scour around permanent structures will develop a 'quasi-equilibrium' with the tidal flow leading to a localised adjustment of sedimentation patterns. Suspension of sand-sized sediments in quiescent working conditions would be a very small fraction of sediment budgets and sediments would rapidly settle locally.
Sediment bed change	(i) Dredging (ii) Dredge disposal (iii) Drilling (iv) Construction Plant (v) Presence of heads	No impact to Coralline Crag outcrops No impact to Beach Localised changes within outer bar No impact to Sizewell Bank	Construction activities (dredge/disposal, drilling and construction plant) lead to temporary loss or penetration of sandy substrate during works. Presence of heads represents a medium term (< 5 years) loss of bed area.

Dredging

Table 3.4: Summary of assessment from dredging

Effect: Negligible, Not Significant				
Impact Magnitude: Very low			**Sensitivity: Low**	
Duration	Extent	Change	Resistance	Resilience
Very low	Low	Very low	Medium	High

3.7.19 The localised lowering of the bed due to dredging would temporarily increase the water depth, slightly reducing current speeds with a minor influence on wave propagation and refraction. Dredging represents both penetration and removal of the substrate over the dredged area, while the plume created by the suction dredge head affects both local suspended sediment concentration and local patterns of deposition. The impacts would be concentrated around the outer bar, which would be the geomorphic element subject to greatest impact.

3.7.20 The assessment in **Volume 2, Chapter 20** of the **ES** [APP-311] and the **First ES Addendum** [AS-181], considered emplacement of three nearshore outfall heads. The desalination plant requires a fourth and fifth. However, the parameters of the original assessment remain largely unchanged – the individual dredge events would be short in duration and at individual scales with limited, localised impacts, and would not interact.

3.7.21 The desalination outfall head would be close to the assessed location of the FRR1 head on the seaward flank of the outer bar, but the two developments would not be contemporaneous, and the heads would not be in place simultaneously, and so the conclusion of the original assessment for FRR1 applies to both FRR1 and the desalination outfall.

3.7.22 Placement of the intake head (approximately 100m further seaward from the bar) would have lesser impacts on principal geomorphic features and processes occurring a short distance away from the main transport conduit.

3.7.23 Thus, as per the assessment in **Volume 2, Chapter 20** of the **ES** [APP-311], as updated by the **First ES Addendum** [AS-181], the effect is classified as negligible and **not significant**.

Dredge spoil disposal

Table 3.5: Summary of assessment from dredge spoil disposal

Effect: Negligible, Not Significant				
Impact Magnitude: Very low			**Sensitivity: Low**	
Duration	Extent	Change	Resistance	Resilience
Very low	Very low	Very Low	Medium	High

3.7.24 The assessment in **Volume 2, Chapter 20** of the **ES** [APP-311], and the **First ES Addendum** [AS-181], considered that the spoil from dredging for the nearshore outfalls would be disposed of within 500m of each extraction site, retaining sediment within the longshore transport system. Potential impacts on hydrodynamics at the disposal site are the reverse of those at the extraction site, in that a disposal mound would temporarily locally reduce water depth and potentially slightly constrict or deflect currents and increase drag on propagating waves until any small mound forming had dispersed.

3.7.25 Rate of dispersal of small mounds may vary depending on their location. In shallower water, though the impact of the mound on flows may be greater than for a mound further offshore, it will as a result be dispersed more quickly: a matter of days, depending on wave conditions. In deeper water, where the impact of waves will be lesser, the dispersal may take longer than in shallower water. However, the significance of an impact on flow would be correspondingly lower further away from the main sediment transport conduit.

3.7.26 Apart from the water depth at the desalination intake head location, all the other assessment parameters are unchanged from that presented in **Volume 2, Chapter 20** of the **ES** [APP-311], as updated by the **First ES Addendum** [AS-181], and the effect is classified as negligible and **not significant**.

Drilling for connection to headworks

Table 3.6: Summary of assessment from drilling for connection to headworks

Effect: Negligible, Not Significant				
Impact Magnitude: Very low			**Sensitivity: Low**	
Duration	Extent	Change	Resistance	Resilience
Very low	Very low	Very low	Medium	High

3.7.27 Headworks would be placed at seaward ends of subterranean tunnels constructed by Horizontal Directional Drilling (HDD) or similar method. **Volume 2, Chapter 20** of the **ES** [APP-311], and the **First ES Addendum** [AS-181], assessed the impact at each of the three locations for the FRRs and CDO – the desalination plant adds two further locations, an outfall at the location of FRR1 on the (present) outer flank of the offshore bar, and an intake head 100m further seaward.

3.7.28 As well as disturbing the substrate, drilling could cause small changes in SSC whilst being undertaken, both by suspending local bed sediment and by the potential leakage of a small amount (a few litres) of bentonite drilling fluid (a clay / water mix) at the point of break-through.

3.7.29 The area of seabed affected is very small and no excavated material from the subterranean tunnel is to be released into the marine environment. The additional impact of the desalination plant drilling works does not significantly increase impact on receptors, which in all cases remains classified as negligible and **not significant**.

Construction platform operations

Table 3.7: Summary of assessment from construction platform operations

Effect: Negligible, Not Significant				
Impact Magnitude: Very low			**Sensitivity: Low**	
Duration	Extent	Change	Resistance	Resilience
Very low	Very low	Very low	Medium	High

3.7.30 Legs from jack-up construction barges used to carry out head emplacement works would penetrate the seabed and would temporarily deflect currents, giving rise to small sediment plumes and initiation of scour.

3.7.31 The assessment for **Volume 2, Chapter 20** of the **ES** [APP-311], and the **First ES Addendum** [AS-181], assessed the impact of the separate works for each head emplacement and the same assessment remains valid for the desalination plant works.

3.7.32 The magnitude of the short-duration impacts on the longshore bar remains very low, and the effect is classified as negligible and **not significant**.

Physical presence of heads during operation of the proposed plant

Table 3.8: Summary of assessment from the physical presence of heads

Effect: Negligible, Not Significant				
Impact Magnitude: Very low			**Sensitivity: Low**	
Duration	Extent	Change	Resistance	Resilience
High	Low	Very low	Medium	High

3.7.33 The presence of the outfall heads would result in a minor obstruction to flow on the seaward flank of the outer bar (which may migrate landward naturally over time). As a result, scour would form around each head – the worst case for scour is in tidal flow only as waves would act to infill and reduce scour depth. This means that scour patterns would not be constant and would change during and after wave events.

3.7.34 The assessment in **Volume 2, Chapter 20** of the **ES** [APP-311], and the **First ES Addendum** [AS-181], assumed a head size which encompasses that required for the desalination head, hence the original assessment remains valid for a head placed at the site of the FRR1 head.

3.7.35 Additional scour assessment was undertaken according to the methodology described in **Volume 2, Appendix 20A** of the **ES** [APP-312] for the hydrodynamic conditions at the proposed intake and outfall head locations and outfall discharge characteristics. The most conservative estimate of scour yields a 2.1m deep pit with a tidally aligned elliptical footprint 17.4 x 11.2m around each structure (i.e., scour extending 7.2m each side of the structure along the tidal axis (N-S) and to 4.1m each side E-W) due to the presence of the intake and outfall heads. At the outfall, there would also be a 0.5m deep elliptical depression of 4.5m length and 2.3m width due to the outfall discharge jet. Scour assessments do not quantify the impacts on flow of the scour hole itself, but the scale of the intake and outfall heads would be too small to interact significantly with flows so the overall magnitude of impact on hydrodynamics is assessed as low.

3.7.36 A small area of concrete mattress may be required to mitigate scour around the pipe connecting the drilled tunnel to each head, which would limit the development of scour at these locations.

3.7.37 Unlike the assessments for the FRR in **Volume 2, Chapter 20** of the **ES** [APP-311], the duration of impacts would not cover the plant operation phase but only the construction. The duration is assessed as high (> 5 years).

3.7.38 The assessment in **Volume 2, Chapter 20** of the **ES** [APP-311] noted that the analogy of the Sizewell C nearshore outfall heads with the Sizewell B outfall was weak due to their considerable reduction in scale and flow rates, but recognised the potential for interactions affecting alignment of the bar as a (highly unlikely) worst-case scenario on the basis of moderately low confidence in understanding of the coastal processes interaction with the Sizewell B outfall.

3.7.39 Overall, the effect continues to be assessed as negligible and **not significant**, but long-term monitoring of the bars is proposed in the **Coastal Processes Monitoring and Mitigation Plan** (**CPMMP**, [REP5-059]).

3.8 Marine Water Quality and Sediments

a) Introduction

3.8.1 This section provides an addendum to the marine water quality and sediment assessment resulting from the Proposed Change 19, with reference to the following documents submitted with the Application:

- **Volume 2, Chapter 21** of the **ES** [AS-034]); and
- **Volume 1, Chapter 2** of the **First ES Addendum** [AS-181].

3.8.2 This chapter references BEEMS Technical report TR552 (**Volume 3**, **Appendix 3.A** of this **Fourth ES Addendum**) which provides a H1 type assessment for potential discharges from the desalination plant.

3.8.3 **Volume 3**, **Appendix 3.A** of this **Fourth ES Addendum** provides an assessment of substances of concern that could be discharged at concentrations above their relevant Environmental Quality Standards (EQS). Mixing zone modelling is applied to those substances that do not pass an initial screening assessment. The assessment also characterises the extent of the saline plume associated with the discharge.

b) Relevant changes

3.8.4 This section considers the influence that construction, operation and removal of a temporary desalination plant would exert upon marine water quality and sediment above that already assessed in the DCO application to date.

3.8.5 Detailed specifications are provided within **Section 3.2** of this chapter. Here the changes and design specification relevant to marine water quality and sediments, and the associated assessments, are provided.

- For abstraction of seawater the desalination plant requires a small-bore pipeline that would be positioned approximately 100m seaward of the proposed location for the Fish Recovery and Return (FRR) outfall for Unit 1;
- The pipe would be installed under the beach and the seabed using a trenchless construction method such as Horizontal Directional Drilling (HDD). The pipe would not be present on or interact with the surface of the beach or seabed except at the drilling exit site (where a headworks intake screen would be located);
- The installation including dredging of the intake and outfall heads and pipelines;
- The intake screen and pipework will be maintained by periodic cleaning using a compressed air cleaning system. Periodic shock chlorination within the headworks would be applied to prevent biofouling. Chlorine dosing would be flow controlled and angled inwards to prevent chlorine emissions to the environment. Abstracted water would be dechlorinated prior to the Sea Water Reverse Osmosis membranes;
- The outfall head would be positioned close to proposed location for the outfall of the Fish Recovery and Return (FRR) Tunnel for Unit 1. The outfall pipe would also be installed under the beach and the seabed using a trenchless construction method such as Horizontal Directional Drilling (HDD). A bentonite recovery system would be used during drilling to minimise emissions;
- The outfall head would include diffusers, in the form of a series of nozzles at the seaward end to help disperse the brine water;
- The intake and outfall headworks will be above the seabed. These works can be considered similar to the headworks for the FRR within the scope of the original assessment;
- Localised dredging is assumed to be necessary in the immediate area surrounding the diffusers;
- The seawater intake headworks would be decommissioned and removed once the freshwater transfer main is fully available;
- The concentrated brine water from the desalination process will be balanced and mixed on the construction site as part of the desalination process. It will then be stored in a storage tank adjacent to the

desalination plant and pumped through the outfall pipe in a controlled manner on a continuous basis (24-hours per day);

- Approximately 90-99% of the loading of most of the substances present in the abstracted seawater would be discharged back to sea as a brine concentrate. The concentrate discharged would be at ambient temperature but would be approximately 1.6 times more concentrated than the natural seawater of Sizewell Bay;
- The only conditioning chemical expected in the discharge concentrate is phosphorus, derived from use of a membrane descaling product;
- The high salinity discharge would be ca., 53 practical salinity units (PSU) compared to an average background salinity of ca., 33.5 PSU.

3.8.6 Sea Water Reverse Osmosis (SWRO) converts 40% of the abstracted water to freshwater.

3.8.7 For the water quality and sediments assessment it has been assumed that dredging for the desalination intake and outfall locations would be the same volume and depth as the other headworks assessed in **Volume 2, Chapter 21** of the **ES** (i.e. the FRR outfalls and the combined drainage outfall (CDO)) (**Table 21.5** and **21.6** in **Volume 2, Chapter 21** of the **ES** [AS-034]). This is likely to be a conservative assumption as the diameter of the desalination plant intake and outfall pipelines (250mm-350mm) are smaller than the FRR pipeline (approximately 650mm). The assessment in **Volume 2, Chapter 21** of the **ES** [AS-034], and the **First ES Addendum** [AS-181], considered emplacement of three nearshore outfall heads. The desalination plant requires a fourth and fifth. However, the parameters of the original assessment remain largely unchanged – the individual dredge events would be short in duration and at individual scales with limited, localised impacts, and would not interact with each other.

3.8.8 The seawater intake pipe, brine water outfall pipe and associated headworks diffusers would be located close to the location of the FRR tunnel headwork for Unit 1, because the water depth is suitable (greater than 5m), and the area has already been extensively tested to establish its suitability as a headworks location. The intake headwork is located approximately 100m north east of the outfall location.

3.8.9 The intake screen and pipework will be maintained with periodic chlorine dosing flow controlled at the intake head and angled inwards to prevent emissions to the environment. Abstracted water is also dechlorinated prior to the SWRO membranes. It has therefore been assumed that chlorine

dosing will be contained within the desalination system and not enter the marine environment.

c) Updated assessment

i. Baseline

3.8.10 The proposed change does not alter the existing and future baseline for marine water quality and sediment as described in **Volume 2, Chapter 21** of the **ES** [AS-034], as updated by the **First ES Addendum** [AS-181].

ii. Environmental Design and Mitigation

3.8.11 The proposed change (**Change 19**) has embedded (primary) mitigation of the impacts on marine water quality and sediment through:

- A trenchless construction method, a Horizontal Direct Drilling (HDD) method, for both pipelines under the beach and intertidal such that the intake and outfall heads are the only features in the marine environment;
- Intake and location has been selected to avoid overlap with the construction outfall discharge;
- Chlorine dosing flow controlled at the intake head and angled inwards to prevent emissions to the environment;
- Process and maintenance chemicals would not be discharged, except for phosphorus (derived from use of a membrane descaling chemical). Aqueous discharges from chemical treatment will be tankered off-site for disposal. This will include monthly and quarterly maintenance of the 'Clean-In-Place' wastewater from the SWRO and prefiltration (ultrafiltration) systems;
- A diffuser head will be employed on outfall to increase mixing of the brine concentrate discharge with seawater and minimise increases in local salinity and influence on the seabed.

3.8.12 The above measures have been secured through Requirement 8 of the **draft DCO** (Doc Ref. 3.1(H) Ch).

3.8.13 Furthermore, the discharges to the marine environment would be controlled and monitored under a Water Discharge Activity Permit issued by the Environment Agency, which is considered to form tertiary mitigation for the purposes of the assessment.

iii. Assessment of Effects

3.8.14 This section details the effects associated with construction of a desalination plant and associated intake and discharge structures that were not previously assessed for the DCO Application (provided in **Volume 2, Chapter 21** of the **ES** [AS-034] nor the **First ES Addendum** [AS-181].

3.8.15 Effects are described for the installation, use and removal of the desalination plant during the construction phase of the proposed development.

Pressures associated with the desalination plant

3.8.16 **Table 3.9** details the pressures associated with the installation and construction of the desalination plant. Pressures that are introduced due to the design specifications detailed in **Section 3.2** with the potential to influence the assessment in the original DCO Application are assessed further.

Table 3.9: Pressures associated with the desalination plant with the potential to affect marine water quality and sediment

Pressure	Activity resulting in Pressure.	Assessed	Justification
Changes in suspended sediments concentration (SSC).	Dredging associated with the intake and outfall (diffuser) head emplacement. Possible bentonite frac-out from Horizontal Directional Drilling (HDD) for intake and brine water outfall.	Yes	Dredging prior to the installation of the seawater intake and outfall headworks and possible bentonite frac-out from HDD would cause temporary increases in SSC. Sediment concentrations are used to provide a context for assessing nutrient status of a waterbody and the potential for increases in phytoplankton productivity and biomass.
Changes in salinity	The discharge of a brine concentrate has an elevated salinity of 53.8 compared to background of 33.3	Yes	Elevated salinity can affect the physiology and behaviour in marine species and at increased salinity the oxygen carrying capacity of the water decreases.
Pollution and other chemical changes (heavy metal contamination)	The desalination brine concentrate would contain heavy metals elevated by 1.6 times above background.	Yes	Heavy metal contaminants in brine discharge may exceed EQS and have the potential to exert toxicological effects.

Pressure	Activity resulting in Pressure.	Assessed	Justification
Pollution and other chemical changes (nutrient enrichment).	The desalination brine would concentrate nutrients in the discharge and phosphorus is added by descaling chemical use	Yes	Phosphorus and nitrogen will increase in concentration above background in the brine concentrate and phosphorus will also be added through use of a membrane descaling chemical. Additional nutrient inputs have the potential to effect primary production therefore phytoplankton growth potential is assessed.

Changes in suspended sediments:(Turbidity)

Magnitude - Dredging

3.8.17 The seawater intake pipe, brine water outfall pipe and associated headworks diffusers would be located close to the location of the FRR tunnel headworks, because the water depth is suitable (greater than 5m), and the area has already been extensively tested to establish its suitability as a headworks location.

3.8.18 The intake headwork is located approximately 100m north east of the outfall location. Localised dredging is assumed to be necessary in the immediate area surrounding the headwork. Dredging volumes are anticipated to be the same as those for the FRR assessment made within **Volume 2, Chapter 21** of the **ES** [AS-034], as updated by the **First ES Addendum** [AS-181]. A maximum of an additional 0.26ha of seabed would be impacted by dredging for the desalination plant headworks.

3.8.19 The magnitude of impacts from dredging for the desalination infrastructure is anticipated to be similar to the assessment made within paragraph 21.6.86 in **Volume 2, Chapter 21** of the **ES** [AS-034] for the FRR outfall installation.

3.8.20 While increases in Suspended Sediment Concentration (SCC) would be large relative to baseline conditions, the transient nature of the plumes and their intermediate spatial footprint result in an impact magnitude of medium.

Sensitivity to changes in suspended sediment concentration - Dredging

3.8.21 Changes in suspended sediments associated with these activities are anticipated to be like those assessed within paragraph 21.6.88 of **Volume**

2, Chapter 21 of the **ES** [AS-034] for the FRR outfall installation, which was predicted to have minor localised effects.

3.8.22 The impact of increased SSC resulting from dredging activities for the installation of the desalination plant is predicted to have a minor adverse effect on turbidity. Effects are predicted to be short-lived and therefore consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 21** of the **ES** [APP-314]) are **not significant** relative to natural background variation in SSC.

Magnitude – Possible bentonite frac-out

3.8.23 The intake and outfall pipe would be installed under the beach and seabed using a trenchless construction method such as Horizontal Directional Drilling (HDD) or similar. It would be launched from the landward size of both the temporary Hard Coastal Defence Feature (HCDF) and haul road, using a drilling rig or similar.

3.8.24 The drilling fluid predominantly used in HDD is a mix of water and a naturally occurring swelling clay, bentonite. Bentonite has a neutral pH level (8-9) and grain size less than 60 microns. Bentonite is on The Convention for the Protection of the Marine Environment of the North-East Atlantic (Oslo-Paris Agreement; OSPAR) commission PLONOR (Pose Little or No Risk to the Environment) list.

3.8.25 If bentonite was released into the marine environment following a frac-out, depending upon flow conditions, clays could remain in suspension for a considerable distance. This increase in the suspended sediment load could potentially result in an increase in the turbidity of the water column.

3.8.26 The amount of bentonite that would be released in the event of a bentonite frac-out is likely to be minimal as a bentonite recovery system would be used during drilling to minimise emissions. The impact magnitude is low.

Sensitivity to changes in suspended sediment concentration - Possible bentonite frac-out

3.8.27 Changes in suspended sediments associated with these activities is anticipated to be like those assessed within paragraph 21.6.88 **Volume 2, Chapter 21** of the **ES** [AS-034] for the FRR outfall installation, which was predicted to have minor localised effects.

3.8.28 The impact of increased SSC resulting from possible bentonite frac-out from HDD is predicted to have a minor adverse effect on turbidity. Effects are predicted to be short-lived and therefore consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 21** of

the **ES** [AS-034]) are **not significant** relative to natural background variation in SSC.

Changes in salinity

Magnitude – brine concentrate discharge influence on salinity

3.8.29 The desalination concentrate discharge would be highly saline at around 20 practical salinity units (PSU) above the background salinity. However, the use of a diffuser head would facilitate more rapid mixing and plume modelling indicates that salinity would fall to within 1 PSU above background within approximately 6-10m of the discharge.

3.8.30 While the duration of the salinity plume is potentially several years, considering the very small area of exposure the impact magnitude is evaluated to be low.

Waterbody sensitivity to changes in salinity- Brine concentrate discharge

3.8.31 Changes in salinity associated with these activities affect small areas of GSB and the waters around the discharge are well mixed and the plume would move across the tidal cycle therefore sensitivity to this change is evaluated as low and effects are therefore **not significant**.

Heavy metal contamination: Status of Waterbody

Magnitude – brine concentrate discharge influence on metal concentrations

3.8.32 Discharge of a reject seawater concentrate in the desalination process would result in higher concentrations of the naturally occurring metals and trace elements in the discharge relative to those in seawater (by a factor of ca., 1.6 times higher). As detailed in **Volume 3**, **Appendix 3.A** of this **Fourth ES Addendum** three metals; zinc, chromium and lead are predicted to be above their Environmental Quality Standard (EQS) values in the desalination concentrate discharge.

3.8.33 Modelling of the concentrate discharge for the three metals identified as of concern was conducted using a mixing zone model as described in **Volume 3**, **Appendix 3.A** of this **Fourth ES Addendum**.

3.8.34 The modelling was precautionary. It evaluated the maximum 6Ml daily discharge volume of concentrate predicted for the peak construction period (associated with a 10Ml abstraction rate). Also, the total concentrations of zinc, lead and chromium were assessed (rather than the dissolved concentrations on which the EQS standards are based) and no

account is made of wave action and natural mixing processes in the relatively shallow waters at this location which would be expected to be well mixed and would facilitate more rapid dilution.

3.8.35 The results of the modelling indicate that the largest plume would be for chromium with a maximum extent above EQS of 38.5m from the discharge point and the predicted area affected is 0.08ha. For zinc the maximum plume extent was 24.9m with an area of 0.03ha, and for lead the maximum plume extent was 20.0m with an area of 0.02ha.

3.8.36 Because water depth at the discharge is only 5.8m, there is a risk of seabed impacts from slack water pooling at low water, where the depths and low velocities will inhibit mixing therefore a maximum area above EQS for each of the metals is precautionarily evaluated as not >0.5ha.

3.8.37 While the duration of the discharge is potentially several years, taking account of the small spatial area of exposure the magnitude is evaluated as low.

Sensitivity to changes in metal concentrations- Brine concentrate discharge

3.8.38 The increase in metal concentrations above EQS or compared with natural background levels associated with these activities would affect a small area of the Greater Sizewell Bay. In a tidally dominated system, the duration of EQS exceedance or levels above background would be very limited. Sensitivity is therefore evaluated as low.

3.8.39 Elevated heavy metal concentrations resulting from the desalination concentrate discharge are therefore predicted to have minor effects on water quality or sediment. Therefore, consistent with the corresponding assessment for the CDO discharge (**Volume 2, Chapter 21** of the **ES** [AS-034]), effects are **not significant**.

3.8.40 Un-ionised ammonia would be concentrated in the brine discharge, however a screening assessment in **Volume 3, Appendix 3.A** of this **Fourth ES Addendum** demonstrates that the EQS will not be exceeded and therefore no further assessment is made.

Nutrient enrichment: Status of Waterbody

Magnitude – brine concentrate discharge influence on nutrient concentrations

3.8.41 Dissolved inorganic nitrogen (DIN) and phosphorus influence the growth of phytoplankton and macroalgae and therefore primary production within a waterbody. Changes in the seasonal concentration cycle of these

nutrients can therefore affect waterbody status. Assessment has been made of DIN and phosphorus inputs during construction activities at Sizewell C.

3.8.42 The most consistent nutrient enriching inputs during the construction period would be from treated sewage and groundwater. Nutrient discharges have the potential to enhance phytoplankton biomass particularly if they occur during periods of nutrient limitation. Potential effects on primary production within the GSB are assessed.

3.8.43 The peak nitrogen and phosphorus additions from the proposed development were compared to the daily exchange of water in the tidal system and the additional nutrient terms were modelled using a combined Phytoplankton and Macroalgae model (CPM).

3.8.44 The desalination brine discharge concentrate would contain nitrogen and phosphorus at ca., 40% above the natural background. Also, phosphorus is added due to the use of a descaling chemical for the desalination reverse osmosis units.

3.8.45 The nitrogen load in the desalination concentrate is low at ca., 0.56kg/day whilst the phosphate loading is higher at ca., 20kg/day. More detail on the nutrient inputs is provided in **Volume 3**, **Appendix 3.A** of this **Fourth ES Addendum.**

3.8.46 The nutrient loadings for the construction related inputs represent ca., 0.2% of those for nitrogen relative to the daily exchange of background nitrogen levels expected in Sizewell Bay during the summer (when background nutrients are lower). For phosphate the figure is higher and represents ca., 2% of the background phosphorus load exchanged per day in Sizewell Bay during the summer period.

3.8.47 Based on the potential level of change in the summer nutrient loading relative to that exchanged daily across the GSB the magnitude of impact is low.

Sensitivity to changes in nutrient concentrations- Brine concentrate discharge

3.8.48 During the summer period nitrogen can be limiting, therefore, to confirm that expected nutrient loadings from construction do not significantly influence conditions in Sizewell Bay a combined phytoplankton and macroalgal model (CPM) has been deployed (**Volume 3**, **Appendix 3.A** of this **Fourth ES Addendum**) and is as described for other construction inputs in **Appendix 22H** of **Volume 2, Chapter 22** of the **ES** [APP-325].

3.8.49 The CPM model predicts that all combined construction nutrient inputs and those from the desalination concentrate would increase the gross primary production ca., 0.39% (**Volume 3**, **Appendix 3.A** of this **Fourth ES Addendum**).

3.8.50 As shown in **Appendix 22H** of **Volume 2, Chapter 22** of the **ES** [APP-325] this level of change in primary production is orders of magnitude below the natural variation in chlorophyll biomass and therefore sensitivity is evaluated as very low.

3.8.51 Added nutrient inputs from the desalination concentrate therefore do not change the assessment made for the construction phase inputs of nutrients (**Volume 2, Chapter 21** of the **ES** [AS-034]), which are considered to have negligible effects and are considered **not significant**.

3.9 Marine Ecology and Fisheries

a) Introduction

3.9.1 This section provides an addendum to the marine ecology and fisheries assessment in relation to the Proposed Change 19 with reference to the following documents submitted for the Application:

- **Volume 2, Chapter 22** of the **ES** [APP-317];
- **Volume 2, Appendix 22D** of the **ES** [APP-321];
- **Volume 2, Appendix 22G** of the **ES** [APP-324];
- **Volume 2, Appendix 22H** of the **ES** [APP-325];
- **Volume 2**, **Appendix 22L** of the **ES** [APP-329];
- **Volume 2**, **Appendix 22L** of the **ES** [APP-329];
- **Volume 2, Appendix 22O** of the **ES** [APP-332];
- **Volume 1, Chapter 2** of the **First ES Addendum** [AS-181]; and
- **Updated Eels regulations assessment** (Doc Ref. 6.3 22O Ad 1 Ch).

3.9.2 The assessment of effects on marine ecology and fisheries is also supported by the following appendix:

- **Volume 3, Appendix 3.A** of this **Fourth ES Addendum**);

- TR552 Sizewell C Desalination Plant Construction Discharge Assessment.

3.9.3 The desalination plant discharge assessment referenced above provides the evidence base for the assessment of effects from the discharges associated with the desalination plant detailed below. The assessment provides a screening of water quality effects based on Environmental Quality Standards (EQS) and modelling of mixing zones for substances which do not pass initial screening. The assessment also characterises the extent of the saline plume associated with the discharge.

b) Relevant changes

3.9.4 The desalination plant would be installed, used and decommissioned within the construction phase. The proposed changes of relevance to the marine ecology and fisheries assessment include:

- The installation and removal, including dredging of the intake and outfall heads and pipelines;
- The physical presence of intake and outfall heads;
- The abstraction of marine water from the desalination intakes; and
- The discharge of brine water via the diffusers at the outfall.

3.9.5 A detailed description of the Proposed Change 19 is provided in **Section 3.2** of this chapter. In this section of the addendum, relevant changes and design specifications specific to marine ecology and fisheries assessments are provided.

3.9.6 It is anticipated that the installation of the desalination plant would occur in the early construction phase and last for 4-6 months.

3.9.7 Sea Water Reverse Osmosis (SWRO) converts 40% of the abstracted water to freshwater.

3.9.8 For the purposes of the marine ecology and fisheries assessment it has been assumed that dredging prior to the installation for the desalination intake and outfalls would be undertaken employing the same method, volume and depth as the other inshore headworks assessed in **Volume 2, Chapter 22** of the **ES** (i.e. the fish recovery and return (FRR) outfalls and the Combined Drainage Outfall (CDO)) (**Table 22.10** in **Volume 2, Chapter 22** of the **ES** [APP-317]). This is likely to be a conservative assumption as the diameter of the desalination plant intake and outfall pipelines (250mm-350mm) is smaller than the FRR pipeline (approximately 650mm). The assessment in **Volume 2, Chapter 22** of the

ES [APP-317], and the **First ES Addendum** [AS-181], considered emplacement of three nearshore outfall heads. The desalination plant intake and outfall diffuser includes a fourth and fifth head. However, the parameters of the original assessment remain largely unchanged – the individual dredge events would be short in duration and at individual scales with limited, localised impacts, and would not interact.

3.9.9 The seawater intake pipe, brine water outfall pipe and associated headworks diffusers would be located close to the location of the Fish Recovery and Return (FRR) tunnel headwork for Unit 1, because the water depth is suitable (greater than 5m), and the area has already been extensively tested to establish its suitability as a headworks location. The intake headwork is located approximately 100m north east of the outfall location (see **Volume 2, Figure 3.1** of this **Fourth ES Addendum**).

3.9.10 The intake screen and pipework will be maintained with periodic chlorine dosing flow controlled at the intake head and angled inwards to prevent emissions to the environment. Abstracted water is dechlorinated prior to the SWRO membranes. It has therefore been assumed that chlorine dosing will be contained within the desalination system and not enter the marine environment.

c) Updated assessment

i. Baseline

3.9.11 The proposed changes do not change the existing and future baseline for marine ecology and fisheries as described in **Volume 2, Chapter 22** of the **ES** [APP-317].

ii. Environmental Design and Mitigation

3.9.12 The proposed change (**Change 19**) has embedded (primary) mitigation of the impacts on marine ecology and fisheries by:

- A trenchless construction method using Horizontal Direct Drilling (HDD) for both intake and outfall pipelines under the beach and through the intertidal reduces surface disturbance and ensures that the intake and outfall heads are the only artificial features introduced into the marine environment i.e., no surface laying pipes;
- Fitting a passive wedge-wire cylinder (PWWC) screen approximately 60cm in diameter and 1.6m in length, with a mesh of approximately 2mm. This screen will prevent ingress of glass eels and other early life stages of fish and larger invertebrates. The headworks would be

positioned orthogonal to tidal currents to reduce the tidal forcing against the screens and minimise approach velocities.

- Chlorine dosing would be flow controlled at the intake head and angled inwards to prevent emissions to the environment.
- Process and maintenance chemicals will not be discharged, with the exception of phosphorus derived from use of a membrane descaling chemical. Aqueous discharges from chemical treatment will be tankered off-site for disposal. This will include monthly and quarterly maintenance of the 'Clean-In-Place' wastewater from the SWRO and prefiltration (ultrafiltration) systems.
- Diffuser heads would be fitted on the outfall to enhance initial mixing and minimise discharge plumes.

3.9.13 The above measures have been secured through Requirement 8 of the **draft DCO** (Doc Ref. 3.1(H) Ch).

iii. Assessment of Effects

3.9.14 This section details the effects associated with the installation and use of the desalination plant.

3.9.15 Effects are described for the installation, use and removal of the desalination plant during the construction phase of the proposed development.

Pressures associated with the desalination plant

3.9.16 **Table 3.10** details the pressures associated with the installation and construction phase use of the desalination plant. Pressures that have changed due to the design specifications detailed in **Section 3.2** with the potential to influence the assessment in the original DCO Application are assessed further.

Table 3.10: Pressures associated with the desalination plant activities during the construction phase.

Pressure	Activity resulting in Pressure.	Receptors	Justification
Habitat change - removal of substratum.	Dredging associated with the intake and outfall (diffuser) head emplacement.	Benthic Ecology. Fish	Additional dredging associated with desalination intake and outfall emplacement resulting in substrate extraction and potential loss of benthic receptors, fish or eggs/egg cases.

Pressure	Activity resulting in Pressure.	Receptors	Justification
Changes in suspended sediments.	Dredging associated with the intake and outfall (diffuser) head emplacement. Possible bentonite frac-out from Horizontal Directional Drilling (HDD) for intake and outfall.	Plankton Benthic ecology. Fish Marine mammals.	Additional dredging prior to the installation of the seawater intake and outfall headworks and possible bentonite frac-out from HDD would cause temporary increases in suspended sediment concentration (SSC). Reductions in light availability due to increases in SSC can affect phytoplankton productivity and biomass. SSC may affect zooplankton through mechanical stress or reductions in feeding efficiency. Increases in SSC have the potential to result in a range of physical and physiological effects on different life history stages and species of fish. Behavioural effects, notably avoidance behaviour, could displace species from preferred habitat or influence the passage of migratory species.
Sedimentation rate changes.	Dredging associated with the intake and outfall (diffuser) head emplacement. Possible bentonite frac-out from Horizontal Directional Drilling (HDD) for intake and outfall.	Plankton Benthic ecology. Fish	Additional dredging would cause deposition of suspended sediments which can lead to smothering of bentho-pelagic zooplankton and benthic receptors. The deposits of sediment could smother eggs/egg cases/larvae, juveniles and small bodied fish. Smothering may result in stress and potential for mortality
Underwater noise.	Dredging (continuous noise source) and removal of headworks.	Fish Marine mammals.	Additional dredging for the intake and outfall (diffuser) headworks would generate underwater noise. The potential effects of underwater noise on fish receptors (eggs, larvae and juvenile and adult stages) and marine mammals is assessed. During removal of the intake heads connecting pipework would need to be cut. As a worst case for underwater noise water jet cutting is assessed.

Pressure	Activity resulting in Pressure.	Receptors	Justification
Visual disturbance.	Activities associated with the installation of the heads.	Marine mammals.	Additional introduction of artificial light can potentially cause disturbance and displacement.
Physical change to another seabed type.	Presence of infrastructure.	Benthic ecology.	Additional seabed infrastructure has the potential to affect benthic ecology receptors through habitat change.
Spread of non-indigenous species.	Presence of infrastructure.	Benthic ecology.	Additional introduction of hard substrate in a primarily soft sediment environment has the potential to affect benthic ecology receptors by facilitating the spread of non-indigenous species.
Loss of access to fishing areas.	Physical presence of infrastructure.	Commercial fishers and recreational boat anglers.	Additional construction works and safety buffer zones around offshore infrastructure have the potential to restrict access to fishing grounds. Effects on commercial and recreational vessels will be assessed further.
Entrainment: Desalination water abstraction.	Desalination water abstraction during the use of the desalination plant.	Plankton Benthic ecology Fish	Up to a maximum of 10Ml per day (10,000m^3/d; equivalent to less than 0.09% of the proposed cooling water abstraction once operational) of seawater will be abstracted from the marine environment and treated to produce potable water for construction activities. The seawater will contain phytoplankton, zooplankton, ichthyoplankton and juvenile fish that could be entrained into the desalination plant.
Heavy metal contamination.	Discharges of heavy metals including zinc, lead and chromium during the use of the desalination plant.	Plankton Benthic ecology. Fish Marine mammals.	A very small proportion of the plankton community within the greater Sizewell Bay (GSB) would be exposed to heavy metal concentrations in exceedance of EQS thresholds or natural background concentrations (refer to **Volume 3, Appendix 3.A** of this **Fourth ES Addendum**. Activities that generate containment discharge have the potential to cause displacement to fin-fish and shellfish and potentially cause lethal and sub-lethal effects upon egg/egg cases and larval stages, with possible consequences for fitness, reproduction and survival of older life stages.

Pressure	Activity resulting in Pressure.	Receptors	Justification
Nutrient enrichment.	Discharges of descaling agents containing phosphorous during the use of the desalination plant,	Phytoplankton	Nutrient discharges have the potential to enhance phytoplankton biomass particularly if they occur during periods of nutrient limitation. Indirect food web effects on higher trophic levels resulting from nutrient additions stimulating primary production are only relevant if effects on primary producers are predicted to be discernible about natural variability. Given the negligible effects on phytoplankton productivity described in **Volume 3, Appendix 3.A** of this **Fourth ES Addendum** no food web effects are predicted.
Increases in salinity.	Saline discharges during the use of the desalination plant.	Plankton Benthic ecology. Fish Marine mammals.	Local changes in salinity associated with the brine discharge from the desalination outfall have the potential to affect the physiology and behaviour (e.g. avoidance) of marine species.
Abrasion / physical disturbance	The use of jack-up barges during removal of the headworks	Benthic Ecology	During removal of the intake headworks a jack-up barge (or similar) will be required at the headwork locations. This pressure is not assessed for installation as effects would be within the assessed dredging footprint.

Habitat change -Removal of substratum: Benthic ecology

Magnitude

3.9.17 Localised dredging would be necessary in the immediate area surrounding the headwork and would involve removal of substrate. Dredging volumes are expected to be the same as for the FRR assessment made within **Volume 2, Chapter 22** of the **ES** [APP-317]. A maximum of an additional 0.26ha of seabed would be impacted by dredging for the desalination plant headworks.

3.9.18 The magnitude of impacts associated with the installation of the desalination infrastructure is anticipated to be the same as the assessment made within **Volume 2, Chapter 22** of the **ES** [APP-317] for the other headworks (FRR and CDO). The impact magnitude is very low

due to the limited spatial extent of dredging relative to the extent of the affected habitat (subtidal sand) in the GSB.

Benthic invertebrate sensitivity

3.9.19 Removal of substratum by dredging has the potential to directly affect benthic invertebrates through physical disturbance and displacement of organisms.

3.9.20 The benthic invertebrate taxa potentially affected by the removal of substratum associated with installation of the desalination infrastructure are the same as those potentially affected by the removal of substratum associated with FRR installation. In both cases, a small proportion of any benthic invertebrate population would be exposed to this pressure, and recovery of populations is expected within the majority of the dredge footprint. Therefore, consistent with the corresponding assessment for FRR installation (see paragraphs 22.7.279-280 **Volume 2, Chapter 22** of the **ES** [APP-317]), benthic invertebrate sensitivity to removal of substratum by dredging is determined to be low.

3.9.21 Substrate removal resulting from dredging activities for the installation of the desalination infrastructure is predicted to have a negligible effect on benthic invertebrates. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) the effect is assessed as being **not significant**.

Habitat change -Removal of substratum: Fish

Magnitude

3.9.22 Localised dredging would be necessary in the immediate area surrounding the headwork and would involve removal of substrate. Dredging volumes are expected to be the same as for the FRR assessment made within **Volume 2, Chapter 22** of the **ES** [APP-317]). A maximum of an additional 0.26ha of seabed would be dredged for the desalination plant headworks.

3.9.23 The magnitude of impacts associated with the installation of the desalination infrastructure is anticipated to be the same as the assessment made within **Volume 2, Chapter 22** of the **ES** [APP-317] for the other headworks (FRR and CDO) installation. The impact magnitude is very low due to the limited spatial extent of dredging relative to the extent of the affected habitat (subtidal sand) in the GSB.

Demersal Fish and Elasmobranch Eggs /Cases and Larvae Sensitivity

3.9.24 Substrate removal can reduce the available habitat for larval settlement or removes larvae and eggs atop the substrate. The removal represents a minimal change to the area of available seabed within the GSB and any losses would be indiscernible. A full sensitivity assessment is provided in paragraphs 22.8.230-231 **Volume 2, Chapter 22** of the **ES** [APP-317].

3.9.25 The sensitivity of demersal fish and elasmobranch eggs/cases and larvae to removal of substratum from dredging, is predicted to be not sensitive.

3.9.26 Removal of sediment associated with localised dredging for the installation of the desalination plant is anticipated to be the same as those assessed within **Volume 2, Chapter 22** of the **ES** [APP-317] for the CDO discharge installation, which was predicted to have negligible effects at the sea area and regional stock/population levels.

3.9.27 The impact of substrate removal resulting from these activities is therefore consistent with the corresponding assessment for the FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]). The effect is predicted to be **not significant** for eggs/cases and larvae relative to sea area and regional stock/population levels.

Demersal Fish and Elasmobranchs Sensitivity

3.9.28 Substrate removal for the head emplacement represents a very small spatial area in terms of the available seabed habitat for foraging or shelter. The mobility of most of the demersal species enables alternative seabed to be exploited within or beyond the GSB (see **Volume 2, Chapter 22, Appendix 22D** and paragraphs 22.8.232 of the **ES** [APP-317] and [APP-321].

3.9.29 The sensitivity of demersal juveniles and adults (and small-bodied fish) to removal of substratum from dredging is predicted to be not sensitive.

3.9.30 Removal of sediment associated with localised dredging for the installation of the desalination plant is anticipated to be the same as that assessed within **Volume 2, Chapter 22** of the **ES** [APP-317] for the CDO discharge installation, which was predicted to have negligible effects.

3.9.31 The impact of substrate removal resulting from these dredging activities is therefore consistent with the corresponding assessment for the FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]). The effect is predicted to be **not significant** for demersal juveniles and adults (and small-bodied fish) relative to the sea area and regional stock/population levels.

Pelagic Fish Eggs and Larvae Sensitivity

3.9.32 Pelagic eggs and larvae are not likely to be sensitive to seabed habitat change due to their pelagic nature. Negligible effects are predicted for pelagic fish eggs and larvae due to substrate removal for the intake and outfall (diffuser) head emplacement. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant** at the sea area and regional stock/population levels.

Pelagic Fish Juveniles and Adults Sensitivity

3.9.33 Direct interaction with the area of substrate removed by dredging activity is minimised as these fish receptors utilise the water column habitat. The sensitivity of pelagic fish juveniles and adults to dredging substrate removal is predicted to be not sensitive. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), negligible effects are predicted which are **not significant** at the sea area and regional stock/population levels.

Migratory Fish Juveniles and Adults Sensitivity

3.9.34 The sensitivity of migratory fish juveniles and adults to removal of substratum from dredging is predicted to be not sensitive due to the limited spatial extent relative to the available habitat.

3.9.35 Negligible effects are predicted for migratory fish juveniles and adults. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant** at the relevant population level.

Localised Displacement:

3.9.36 Removal of substratum causing displacement of fish receptors to alterative areas would occur over a very limited area and effect a very small proportion of fish within the GSB. Fish are not sensitive to the pressure. Substrate removal is predicted to have a negligible effect on the distribution of fish within the GSB. **No significant changes** in the availability of fish as prey items for designated features or as fisheries resources are predicted.

Changes in suspended sediments: Plankton, Benthic Ecology and Fish

Magnitude

3.9.37 The magnitude of impacts of changes in suspended sediment for the desalination infrastructure is anticipated to be the same as those for the FRR and CDO head. Empirical modelling in **Volume 2, Chapter 22, Appendix 22J** [APP-327] provided evidence for SSC at receptor specific

depth profiles and was used to inform impact assessments. Dredging volumes and release locations are anticipated to be comparable with those for the FRR and CDO head assessments made within **Volume 2, Chapter 22** of the **ES** [APP-317].

3.9.38 While increases in SSC would be relatively large compared to baseline conditions, the transient nature of the plumes and their intermediate spatial footprint result in an impact magnitude of medium for plankton, benthic ecology and fish receptors.

Phytoplankton Sensitivity - Changes in suspended sediments

3.9.39 Phytoplankton exposed to increases in SSC may be susceptible to reductions in productivity. The short duration and transitory nature of the plume indicate that small declines in primary productivity may occur, but recovery would be rapid following cessation of the dredging activity. A full sensitivity assessment is provided in **Table 22.19** of **Volume 2, Chapter 22** of the **ES** [APP-317].

3.9.40 The sensitivity of phytoplankton populations to the predicted increases in SSC is low.

3.9.41 Changes in suspended sediments associated with dredging for the desalination plant intake and outfall head emplacement activities is anticipated to be the same as those assessed within **Volume 2, Chapter 22** of the **ES** [APP-317] for the FFR outfall installation, which was predicted to have minor localised effects.

3.9.42 The impact of increased SSC resulting from dredging activities for the installation of the desalination plant is predicted to have a minor adverse effect on phytoplankton. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) effects are predicted to be short-lived and **not significant** relative to natural variation in biomass.

Zooplankton Sensitivity - Changes in suspended sediments

3.9.43 Increases in SSC may have adverse effects on fitness of some zooplankton taxa by decreasing ingestion rates and/or egg production rates. High natural fecundity and exchange with the wider southern North Sea afford a high degree of resilience (see **Table 22.19** in **Volume 2, Chapter 22** of the **ES** [APP-317]).

3.9.44 The sensitivity of zooplankton to increases in SSC is low.

3.9.45 Changes in suspended sediments associated with dredging for the desalination plant intake and outfall head emplacement activities is anticipated to be the same as those assessed within **Volume 2, Chapter**

22 of the **ES** [APP-317]) for the FFR outfall installation, which was predicted to have minor localised effects.

3.9.46 The impact of increased SSC resulting from dredging activities for the installation of the desalination plant is predicted to have a minor adverse effect on zooplankton receptors. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-3175]) effects are predicted to be short-lived and **not significant** relative to natural variation in population abundance.

Benthic invertebrate sensitivity

3.9.47 Changes in SSC have the potential to affect benthic invertebrates by interfering with feeding.

3.9.48 The benthic invertebrate taxa potentially affected by changes in SSC associated with dredging during the installation of desalination infrastructure are the same as those potentially affected by changes in SSC associated with dredging for FRR installation. The types of benthic invertebrates that are most likely to be affected by changes in SSC are suspension feeders and taxa with planktotrophic larvae, as both filter their food out of the water column. The corresponding assessment for FRR installation determined that suspension-feeding benthic invertebrates and benthic invertebrates with planktotrophic larvae in the area are not sensitive to increases in SSC caused by dredging because suspension feeders have high tolerance, or positive responses to increased SSC and key benthic taxa in the GSB which are obligate suspension feeders are often found in high turbidity environments (see paragraph 22.7.56 **Volume 2, Chapter 22** of the **ES** [APP-317]). Therefore, it is concluded that benthic invertebrates are also not sensitive to increases in SSC associated with during the installation of desalination infrastructure.

3.9.49 The effect on benthic invertebrates of changes in SSC resulting from activities associated with the installation of desalination infrastructure is predicted to be minor adverse for dredging. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) the effect is assessed to be **not significant**.

***Sabellaria spinulosa* reef sensitivity**

3.9.50 Changes in SSC have the potential to affect *S. spinulosa* reef, as suspended solids are required to build the tubes that form the reef structure and tube erosion occurs when the supply is insufficient.

3.9.51 Empirical modelling from the FRR dredging activities (**Volume 2, Chapter 22, Appendix 22J** [APP-317]) shows the distribution and concentration of suspended sediment plumes within the GSB. Sediment suspended by

dredging for the desalination heads may overlap *S. spinulosa* reefs on the inshore Coralline Crag outcrops within the GSB. As with increases in SSC caused by dredging for FFR installation, *S. spinulosa* reef is predicted to be not sensitive to the expected changes to SSC, however, short-term increase in tube growth is possible (see paragraph 22.7.286 **Volume 2, Chapter 22** of the **ES** [APP-317]).

3.9.52 The effect on *S. spinulosa* reef of changes in SSC resulting from activities associated with the installation of desalination infrastructure is predicted to be minor beneficial for dredging. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) the effect is **not significant**.

Demersal Fish and Elasmobranch Eggs /Cases and Larvae Sensitivity

3.9.53 Spawning/nursery grounds in the GSB area encompass Dover sole, plaice, cod, sea bass and thornback ray. Exposure to increases in SSC may cause eggs and larvae to be susceptible to direct mortality at the highest suspended sediment concentrations, and sub-lethal effects. While localised egg/larvae mortality may occur, the losses are generally considered minimal compared to natural mortality. A full sensitivity assessment is provided in the **Volume 2, Chapter 22, Table 22.65** and paragraphs 22.8.245-248 of the **ES** [APP-317], for the CDO discharge installation.

3.9.54 The sensitivity of demersal fish and elasmobranch eggs /cases and larvae to increases in SSC is predicted to be low.

3.9.55 Increased SSC associated with localised dredging for the installation of the desalination plant is anticipated to be comparable to the dredge volumes and in a similar location as those assessed for the FRR and CDO head assessments made within **Volume 2, Chapter 22** of the **ES** [APP-317]. These assessments precautionarily predicted minor adverse effects. The impact of changes in SSC concentrations resulting from dredging activities is predicted to be **not significant** for eggs/cases and larvae relative to the sea area and regional stock/population levels.

Demersal Fish and Elasmobranchs Sensitivity

3.9.56 The increases in SSC relative to background are modest over the area of the GSB potentially utilised by juveniles and adults. These species may be able to avoid areas of high SSC or compensate for elevated SSC. In the case of cod, it has been shown that though cod made explorations into a sediment plume where gill cleansing behaviour was observed, no avoidance behaviour was detected (Ref.1) (see **Volume 2, Chapter 22, Table 22.65** and paragraphs 22.8.249-220 of the **ES** [APP-317]).

3.9.57 The sensitivity of demersal fish and elasmobranch juveniles and adults to increases in suspended sediment from dredging, is predicted to be low.

3.9.58 Changes to SSC concentrations associated with localised dredging for the installation of the desalination plant is anticipated to be the same as those assessed in **Volume 2, Chapter 22** of the **ES** [APP-317] for the CDO discharge installation, which was predicted to have minor adverse effects. The impact of increased SSC resulting from dredging activities associated with the installation of desalination infrastructure is predicted to be **not significant** for demersal juveniles and adults relative to the sea area and regional stock/population levels.

Pelagic Fish Eggs and Larvae Sensitivity

3.9.59 Herring, mackerel and sprat nursery grounds overlap with the GSB (see paragraph 22.8.84 **Volume 2, Chapter 22,** and of the **ES** [APP-317])), though these extend beyond this area and will be maintained by natural influxes of eggs and larvae. Pelagic eggs and larvae are predicted to be not sensitive to increases in suspended sediment and minor adverse effects are predicted from the impact of SSC increases. Effects from both dredging activities and possible bentonite frac-out from HDD are therefore consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) and **not significant** at the sea area and regional stock/population levels.

Pelagic Fish Juveniles and Adults Sensitivity

3.9.60 Fish remaining in an exposed area may physiologically compensate or avoid the plume; localised displacement effects are considered separately. Though possible sub-lethal effects and mortality could result from increased SSC, pelagic species mobility provides access to habitat within and outside the GSB.

3.9.61 The sensitivity of pelagic fish juveniles and adults to increases in SSC associated with dredging is predicted to be low. Minor adverse effects are predicted and effects from dredging activities are therefore consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) and **not significant** at the sea area and regional stock/population levels.

Migratory Fish Juveniles and Adults Sensitivity

3.9.62 Suspended sediment plumes have the potential to cause lethal, sub-lethal and behavioural plume avoidance effects on migratory species. A full sensitivity assessment is provided in the **Volume 2**, **Chapter 22**, paragraphs 22.8.257-262 of the **ES** [APP-317], for the CDO discharge installation.

3.9.63 Migratory fish juveniles and adults are predicted to be not sensitive to increases in SSC from dredging due to the limited spatial extent relative to the available habitat.

3.9.64 Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects from both dredging activities are **not significant** for migratory fish juveniles and adults at the sea area and regional stock/population levels.

Localised Displacement

3.9.65 The avoidance of fish to SSC plumes, notably pelagic fish, would be influenced by factors such as motivation, mobility and condition. Thus, fish may exhibit limited movements away from the areas of SSC, remaining in proximity to the plume and utilising the area once the plume dissipates. Should the passage of the plume influence fish behaviour, particularly those of ecological value as prey species of designated sea birds the potential exists for temporary reductions in foraging success. However, given the limited persistence and transitory nature of the plume, the scope for fish to be displaced entirely from the plume area and not return is very limited. Fish are predicted to have low sensitivity with only localised and temporary displacement of sensitive taxa likely to occur. Displacement of fish is predicted to have a minor adverse effect. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), **no significant** changes in the availability as prey items for designated features and as fisheries resources are predicted.

Changes in suspended sediments: Marine mammals

Magnitude

3.9.66 The magnitude of impacts of changes in suspended sediment for the desalination infrastructure is anticipated to be the same as those for the FRR and CDO head. Dredging volumes and release locations are anticipated to be comparable with those for the FRR and CDO head assessments made within **Volume 2, Chapter 22** of the **ES** [APP-317] and empirically modelled in **Volume 2, Chapter 22, Appendix 22J** [APP-327]. Increases in SSC would be relatively large compared to baseline conditions, given the transient nature of the plumes, the wide foraging range of marine mammals and the spatial and temporal extent of this impact, the impact magnitude is therefore low.

Sensitivity

3.9.67 A full sensitivity assessment is provided in paragraphs 22.9.38-42 of **Volume 2, Chapter 22,** of the **ES** [APP-317]. Harbour porpoise and seals

are well adapted to existence in turbid coastal waters and are therefore resistant to this pressure.

3.9.68 Indirect effects relating to changes in prey availability due to behavioural avoidance by fish from the plume could occur but this has been assessed as minor and **not significant**, as noted above. Marine mammals have large foraging ranges and highly localised prey displacement would not be a significant impact on marine mammals foraging in the area. Therefore, it is considered that marine mammals are not sensitive to increases in SSC associated with dredging activities associated with the desalination plant.

3.9.69 The impact of increased SSC resulting from dredging activities for the installation of the desalination plant is predicted to have a negligible effect on marine mammal receptors. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) effects are **not significant**.

Sedimentation rate changes: Plankton, Benthic Ecology, Fish

Magnitude

3.9.70 Sediment suspended by dredging and dredge disposal for the installation of the desalination plant would subsequently be deposited onto the seabed. It is predicted that all suspended sediment would be deposited within hours of dredging and then dispersed by natural resuspension. The magnitude of impacts of sedimentation for the desalination infrastructure is anticipated to be the comparable to the FRR and CDO head assessments made within **Volume 2, Chapter 22** of the **ES** [APP-317] and empirically modelled in **Volume 2, Chapter 22, Appendix 22J** [APP-327]. As no area would be exposed to more than 'light' deposition, and deposited sediments would be rapidly dispersed, the impact magnitude is assessed as very low.

Plankton Sensitivity

3.9.71 The sensitivity of plankton to sediment deposition has been assessed as low (see **Table 22.19** in **Volume 2, Chapter 22** of the **ES** [APP-317]). Zooplankton have low sensitivity, while phytoplankton are assessed as not sensitive. Sediment deposition following dredging for the installation of the desalination plant is predicted to have negligible effects on plankton receptors. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) effects are **not significant**.

Benthic invertebrate sensitivity

3.9.72 Sediment deposition has the potential to affect benthic invertebrates by smothering.

3.9.73 The benthic invertebrate taxa potentially affected by sedimentation associated with dredging during the installation of desalination infrastructure are the same as those affected by sedimentation associated with dredging for the CDO and FRR head installation. Sessile/low mobility benthic invertebrates in the area are likely to be less tolerant of smothering than mobile benthic invertebrates; however, populations from both groups would only be exposed to 'light' deposition. The corresponding assessment for FRR installation determined that mobile benthic invertebrates in the area are not sensitive to sedimentation caused by dredging, whereas sessile benthic invertebrates have low sensitivity (see paragraph 22.7.291 **Volume 2, Chapter 22** of the **ES** [APP-317]). These sensitivities also apply to sedimentation associated with dredging during the installation of desalination infrastructure.

3.9.74 Sedimentation rate changes resulting from dredging during the installation of the desalination infrastructure are predicted to have a negligible effect on benthic invertebrates. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), the effect is **not significant**.

***Sabellaria spinulosa* reef sensitivity**

3.9.75 Sediment deposition has the potential to affect *S. spinulosa* reef by smothering.

3.9.76 Sediment suspended from dredging during the installation of desalination infrastructure could be deposited on *S. spinulosa* reefs on the inshore Coralline Crag outcrops in the GSB. As with sedimentation caused by dredging for FRR installation, it is assessed that *S. spinulosa* reef is not sensitive to the 'light' deposition that would occur (see paragraph 22.7.293 **Volume 2, Chapter 22** of the **ES** [APP-317]). Sediment deposition following dredging for the installation of the desalination plant is predicted to have a negligible effect on *S. spinulosa* reef. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant**.

Demersal Fish and Elasmobranch Eggs /Cases and Larvae Sensitivity

3.9.77 Light deposition has the potential to smother immobile eggs and larvae on the seabed. While localised egg/larvae mortality may occur, no declines in abundance of the respective stocks/populations are expected. A full sensitivity assessment is provided in the **Volume 2, Chapter 22** of the **ES** [APP-317] **Table 22.65** and paragraphs 22.8.124-125.

3.9.78 The sensitivity of demersal fish and elasmobranch eggs/cases and larvae to changes in sedimentation rates is predicted to be not sensitive.

3.9.79 The impact changes in sediment rates resulting from dredging activities is anticipated to be the same as those assessed within **Volume 2, Chapter 22** of the **ES** [APP-317] for the CDO discharge installation, which was predicted to have a negligible effect and to be **not significant** for eggs/cases and larvae relative to sea area and regional stock/population levels.

Demersal Fish and Elasmobranchs Sensitivity

3.9.80 Demersal juvenile and adult demersal fish have the capacity to physiologically compensate for temporary sediment deposition or move away from affected areas and tolerate similar levels of sedimentation from storms and tidal action.

3.9.81 The sensitivity of demersal fish and elasmobranch juveniles and adults to changes in sedimentation rates is predicted to be not sensitive. A full sensitivity assessment is provided in the **Volume 2, Chapter 22** of the **ES** [APP-317] in paragraphs 22.8.126-127.

3.9.82 Changes in sediment rates associated with localised dredging for the installation of the desalination plant is anticipated to be the same as those assessed within **Volume 2, Chapter 22** of the **ES** [APP-317] for the CDO discharge installation, which was predicted to have negligible effects. Effects from dredging activities are **not significant** for demersal juveniles and adults (and small-bodied fish) relative to the sea area and regional stock/population levels.

Pelagic Fish Eggs and Larvae Sensitivity

3.9.83 The pelagic nature of eggs and larvae for most species minimises exposure to the pressure. Pelagic eggs and larvae are not likely to be sensitive to changes in sedimentation rate and negligible effects are predicted. A full sensitivity assessment is provided in the **Volume 2, Chapter 22** of the **ES** [APP-317] in paragraphs 22.8.129-131. Effects from dredging activities are therefore consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) and **not significant** at the sea area and regional stock/population levels.

Pelagic Fish Juveniles and Adults Sensitivity

3.9.84 Juvenile and adult pelagic fish can avoid smothering risks as they predominately occur above the seabed and are able to avoid deposition and return to an affected area once the impact ceases. Pelagic juveniles

and adults are predicted not to be sensitive to changes in sediment rates. Negligible effects from dredging activities are predicted. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant** at the sea area and regional stock/population levels.

Migratory Fish Juveniles and Adults Sensitivity

3.9.85 Of the migratory species, eels buried in the seabed or present near the seabed would be able to emerge from the light deposition. No declines in stock/population for any migratory species are predicted. The sensitivity of migratory juveniles and adult fish are predicted to be not sensitive to changes in sedimentation rates and the impact is predicted to have a negligible effect.

3.9.86 Effects from dredging activities are therefore consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) and **not significant** at the sea area and regional stock/population levels. The small spatial scale and availability of alternative foraging areas, and the reductions in fitness are negligible.

Localised Displacement:

3.9.87 Changes in sedimentation rates associated with dredging installation of desalinisation plant is not predicted to affect the distribution of fish within the GSB. No indirect food web effects or changes in the availability of fish as prey items for designated features or as fisheries resources are expected. Fish are not sensitive to displacement resulting from sedimentation rate changes. Effects from dredging activities are predicted to be negligible. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) effects are **not significant.**

Possible bentonite frac-out: All Receptors

Magnitude

3.9.88 The intake and outfall pipe would be installed under the beach and seabed using a trenchless construction method such as HDD. The lubricating drilling mud predominantly used in HDD is a mix of water and a naturally occurring swelling clay, bentonite. Bentonite has a neutral pH level (8-9) and grain size less than 60µm (micrometres). Bentonite is on The Convention for the Protection of the Marine Environment of the North-East Atlantic (Oslo-Paris agreement; OSPAR) commission PLONOR (Pose Little or No Risk to the Environment) list. A bentonite recovery system would also be used during drilling to minimise the potential for release should frac-out occur.

3.9.89 A recovery system is proposed minimising residual bentonite. If bentonite was released into the marine environment, following a frac-out, depending upon flow conditions, clays could remain in suspension for a considerable distance. This increase in the suspended sediment load could potentially result in an increase in the turbidity of the water column. The amount of bentonite that would be released in the event of a frac-out is likely to be minimal as a bentonite recovery system would be used during drilling to minimise emissions. The impact magnitude is low.

3.9.90 If bentonite was released into the marine environment, following a frac-out, smothering of the seabed could occur from deposition of the suspended material. The amount of bentonite that would be released in the event of a bentonite frac-out is likely to be minimal as a bentonite recovery system would be used during drilling to minimise emissions. The potential impact magnitude is very low.

Sensitivity

3.9.91 The sensitivity of plankton, benthic fish and marine mammal receptors to possible changes in suspended sediment following any bentonite frac-out are considered to be the same as sedimentation rate changes associated with dredging. In the event of bentonite frac-out effects on plankton, benthic receptors, fish and marine mammal receptors are predicted to be negligible (marine mammals), or minor adverse (plankton, benthic and fish receptors) and **not significant**.

3.9.92 The sensitivity of plankton, benthic and fish receptors to possible changes in sedimentation rates following any bentonite frac-out are considered to be the same as sedimentation rate changes associated with dredging. In the event of bentonite frac-out effects on plankton, benthic receptors and fish receptors are predicted to be negligible. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant**.

Underwater noise: Fish

Magnitude

3.9.93 Underwater noise modelling for dredging activities associated with the FRR and CDO heads assumed dredging would last for 9.5 hours and applied precautionary source levels from a large trailing suction hopper dredger (**Volume 2, Appendix 22L** of the **ES** [APP-317]. The impact magnitude of underwater noise from dredging activities for the desalination plant intakes and outfall heads would remain within the parameters of those assessed in the ES **Volume 2, Chapter 22,** of the **ES** [APP-317].

3.9.94 Fish receptors are classified into different categories depending on their hearing abilities and sensitivity to underwater noise exposure (**Table 22.70** of the **ES Volume 2, Chapter 22,** [APP-317]). Noise levels arising from dredging activities are predicted to be too low to generate instantaneous auditory effect zones for fish. The predicted cumulative (24-hour) noise exposure effects exceed thresholds for effects. However, the effect ranges are spatially limited with the most sensitive species incurring cumulative mortality only within 25m of the sound source and recoverable injury is limited to 100m (3ha) (see **Volume 2, Chapter 22, Table 22.89** of the **ES** [APP-317]). Dredging for the installation of the desalination headworks would be short-term discrete events.

3.9.95 The impact magnitude of underwater noise associated with dredging is low.

3.9.96 Following use of the desalination plant in the construction phase the headworks would be removed. Once the headworks are removed the pipework would likely be cut and capped. The worst-case mechanical cutting options for underwater noise would be high pressure water jets. The effects of water jet cutting were assessed for the decommissioning of the temporary Beach Landing Facility (BLF) based on worst-case assumptions and at the deepest point for greatest sound propagation (**Underwater Noise Report** [REP5-124]). Noise levels would be too low to generate instantaneous effects. Cumulative predicted effect ranges for mortality and recoverable injury were within 25m of the sound source. TTS effects of the water jet cutting decommissioning method were predicted to be less than for dredging at 92ha (600m) applying the assumption of no fleeing. Impacts associated with removal of the heads is less than those assessed for installation. The impact magnitude is low.

Fish with swim bladder or other air cavities to aid hearing (Category 1) Sensitivity

3.9.97 Instantaneous auditory effects would not occur from continuous noise sources associated with dredging. Cumulative noise exposure modelling for category 1 fish (such as herring and sprat) indicates the potential for mortality/potential mortality is negligible within 25m (or 0.25ha). Recoverable injury is limited to fish remaining within 100m (3ha) for the duration of the dredging activities. The maximum potential for TTS extends to a range of 1.1km (or 173ha) (see **Volume 2, Chapter 22, Table22.89** of the **ES** [APP-317]).

3.9.98 Exposure of fish may reduce survival and fitness through hearing impairment, while physical and/or physiological effects could lower fitness levels until recovery. High recoverability from TTS is anticipated.

3.9.99 Dredging is not anticipated to be continuous within a 24-hour period and would be short term. Where individuals have experienced minor disturbances and moved away from dredging, it is anticipated they would return to the area in a matter of hours to days. As detailed in paragraph 2.17.216 of **Volume 1, Chapter 2** of the **First ES Addendum** [AS-181] fish return to previously disturbed areas quickly following vessel disturbance, and it can be expected that the same behaviour would occur following minor disturbance from dredging.

3.9.100 The sensitivity of Category 1 receptors to underwater noise from construction dredging and removal of the desalination headworks is predicted to be low.

3.9.101 The impact of underwater noise from dredging and headwork removal is predicted to have a minor adverse effect on Category 1 receptors. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant** at the sea area and regional stock/population levels.

Fish with a swim bladder that does not aid hearing (Category 2) Sensitivity

3.9.102 In the case of Category 2 fish such as European sea bass and eel, limited cumulative noise impact zones are predicted. Recoverable injury for Category 2 is the same as for Category 1. The sensitivity of Category 2 receptors to underwater noise from construction dredging and removal of the desalination headworks is predicted to be low.

3.9.103 The impact of underwater noise from construction dredging and removal of the desalination headworks is predicted to have a minor adverse effect on Category 2 receptors. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant** at the sea area and regional stock/population levels.

Fish without a swim bladder (Category 3) Sensitivity

3.9.104 Cumulative auditory impact ranges for Category 3 fish are predicted to be limited to TTS which have the same range as for Category 1 and 2 fish. The sensitivity of Category 3 receptors to underwater noise from construction dredging and removal of the desalination headworks is predicted to be not sensitive.

3.9.105 The impact of underwater noise from construction dredging and removal of the desalination headworks is predicted to have a negligible effect on Category 3 receptors. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-

317]), effects are **not significant** at the sea area and regional stock/population levels.

Demersal and pelagic fish eggs and larvae

3.9.106 In addition to the three hearing groups, egg and larval stages have been considered in the assessment. This is because swim bladders may develop during the larval stage (Dover sole and sand gobies) and so larvae may be susceptible to pressure-related injuries like barotrauma (Ref. 3.

3.9.107 The sensitivity of demersal and pelagic fish eggs and larvae to underwater noise from construction dredging and removal of the desalination headworks is precautionarily assessed as low.

3.9.108 The impact of underwater noise from construction dredging and removal of the desalination headworks is predicted to have a minor adverse effect on demersal and pelagic fish eggs and larvae. However, the limited magnitude of the dredging means potential losses of eggs and larvae are considered negligible in comparison to natural mortality. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant**.

Localised Displacement

3.9.109 The applied behavioural thresholds are based on the best available evidence, from peer-reviewed literature on response to impulsive noise. In the cause of continuous dredging noise, they provide a conservative indicator for the risk of behavioural responses and do not necessitate displacement. A full sensitivity assessment is provided in the **Volume 2, Chapter 22,** paragraphs 22.8.292-295 of the **ES** [APP-317], for the CDO installation.

3.9.110 Behavioural effects from dredging are predicted to be greater than for cutting activities for the removal of the headworks. Dredging effect ranges are limited to ~2.3km (or an area of ~670ha,) for Category 1 and Category 2 receptors and ~ 800m (~120ha) for Category 3 receptors. Modelled ranges are provided in the **Volume 2, Chapter 22**, **Table 22.90** of the **ES** [APP-317].

3.9.111 Fish are precautionarily assessed as having low sensitivity to displacement from dredging activities. Should displacement occur the impact is temporary, and fish could return within hours to days of the impact ceasing.

3.9.112 Localised displacement of fish receptors due to underwater noise from dredging for the installation of desalination plant, is predicted to have a

minor adverse effect on the displacement of fish. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant**.

3.9.113 The indirect effects of localised displacement of fish as prey species for bird receptors are assessed in an EIA context in **Volume 2, Chapter 14, Sections 14.12c)i** and **14.12c)ii** of the **ES** [APP-224]. This assessment is unchanged by the additional dredging associated with the desalination plant as the dredging works will be short in duration and not overlap with dredging for other installations.

Underwater noise: Marine mammals

Magnitude

3.9.114 Underwater noise modelling for dredging activities associated with the FRR and CDO heads assumed dredging would last for 9.5 hours and applied precautionary source levels from a large trailing suction hopper dredger (**Volume 2, Appendix 22L** of the **ES** [APP-329]. The impact magnitude of underwater noise from dredging activities for the desalination plant intakes and outfall heads would be within the envelope of those assessed in the ES **Volume 2, Chapter 22,** of the **ES** [APP-317].

3.9.115 Noise levels from dredging are predicted to be too low to generate instantaneous auditory effect zones for marine mammals. Dredging associated with the FRRs resulted in harbour porpoise cumulative auditory effect zones with TTS extending to ~6.5km and PTS to ~0.8km, where continuous exposure over 24 hours was assumed. When a fleeing scenario is considered, no PTS was predicted while TTS is expected within ~1km (see **Table 22.133** in **Volume 2, Chapter 22** of the **ES** [APP-317]).

3.9.116 The predicted cumulative sound exposure effects on harbour seal and grey seal were much smaller than the corresponding predictions for harbour porpoise, TTS extending to ~1.4km (299ha) and PTS to ~0.05km (1ha). Fleeing cumulative scenarios did not predict any PTS or TTS impact zones (see **Table 22.133 Volume 2, Chapter 22** of the **ES** [APP-317]).

3.9.117 On a precautionary basis due to the assumption of fleeing sensitivity is assumed to be medium, despite the low effect range and short-duration of the impact.

3.9.118 Following use of the desalination plant in the construction phase the headworks would be removed. Once the headworks are removed the pipework would likely be cut and capped. The worst-case mechanical cutting options for underwater noise would be high pressure water jets.

The effects of water jet cutting were assessed for the decommissioning of the temporary BLF based on worst-case assumptions and at the deepest point for greatest sound propagation (**Underwater Noise Report** [REP5-124]). Noise levels from this method will be too low to generate instantaneous auditory effect zones for marine mammals. Assessments of fleeing behaviour assumed that marine mammals would flee from the source location at the onset of activity. Cumulative sound exposure was predicted for removing two piles within 24-hours, with the maximum interval of 1 hour per pile. The cumulative auditory PTS effect zone for harbour porpoise and phocid seals was predicted to be negligible (25m from source). The cumulative TTS was predicted as approximately 2ha for harbour porpoise and negligible for phocid seals (25m from source). Impacts associated with removal of the heads are predicted to be less than those assessed for dredging. A precautionary impact magnitude of low is applied.

Sensitivity

3.9.119 Although there are many uncertainties regarding the effects of dredging noise on marine mammals, the literature suggests that dredging noise is unlikely to cause direct mortality or instantaneous injury. However, the (predominantly) low-frequency sounds produced by dredging overlap with the hearing range of many marine mammal species, which may pose a risk for temporary threshold shifts, auditory masking, and behavioural effects (Ref. 4). A full sensitivity assessment is provided in paragraphs 22.9.67-71 of **Volume 2, Chapter 22**, of the **ES** [APP-317].

3.9.120 The results of the noise modelling are in line with this statement given that no instantaneous auditory effects were predicted and cumulative fleeing models indicate only modest TTS ranges, (**Volume 2, Appendix 22L** of the **ES** [APP-329]).

3.9.121 It is expected that any marine mammals in the area would retreat to a safe distance before injury could occur, therefore showing a high degree of resistance to this pressure.

3.9.122 The sensitivity of marine mammal populations to underwater noise from dredging during the construction of the desalination plant, and subsequent removal of the headworks is predicted to be low.

3.9.123 The impact of increased underwater noise resulting from dredging activities is predicted to have a minor adverse effect on marine mammals. Effects are predicted to be short-lived and return to baseline conditions rapidly after dredging activity ceases. The impact of underwater noise from the removal of the headworks is predicted to be minor adverse. Therefore, consistent with the corresponding assessment for FRR

installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant**.

Visual disturbance: Marine mammals

Magnitude

3.9.124 Construction of the desalination plant would take approximately 4-6 months. Artificial lighting in the marine environment would be a likely requirement during dredging and installation works for the desalination intake and outfall.

3.9.125 The magnitude of impacts of the desalination infrastructure is anticipated to be the same as the assessment made in **Volume 2, Chapter 22** of the **ES** [APP-317]) for the FFR outfall installation. Localised dredging is assumed to be necessary only in the immediate area surrounding the intake headwork and brine water outfall diffusers. Therefore, any artificial light introduced would be short-lived.

3.9.126 The magnitude of the impact is considered as low.

Sensitivity

3.9.127 Introduction of artificial light could potentially cause visual disturbance. However, vision is not their primary sense as they rely on hearing for the majority of the ecologically important activities including navigation, foraging, and communication. A full sensitivity assessment is provided in paragraphs 22.9.84-87 of **Volume 2, Chapter 22,** and of the **ES** [APP-317].

3.9.128 It is considered that marine mammals are not sensitive to visual disturbance from artificial light during the construction of the desalination headworks.

3.9.129 The impact of visual disturbance from artificial light is predicted to have a negligible effect on marine mammal receptors. Therefore, consistent with the corresponding assessment for construction lighting (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant.**

Physical change to another seabed type: Benthic ecology

Magnitude

3.9.130 The installation of the desalination intake and outfall heads and any associated scour protection would result in a change in seabed type from soft sediment (fine to medium sand) to an artificial hard surface. The magnitude of impacts of the desalination infrastructure is anticipated to be the same as the assessment made within **Volume 2, Chapter 22** of the

ES [APP-317]) for the FFR outfall heads. However, the duration would be shorter, as the desalination headworks and associated scour protection would be removed during the construction phase of the project. Given the very small spatial area and medium duration, the magnitude is low.

Benthic invertebrate sensitivity

3.9.131 Benthic species with preferences for soft or hard substrates would be affected by a change in seabed type from soft sediment (fine to medium sand) to a hard surface.

3.9.132 The installation of desalination intake and outfall heads and any associated scour protection is unlikely to affect soft sediment benthic invertebrates as they would have already been largely removed by dredging; however, species that prefer hard surfaces would be able to colonise the new infrastructure. As with FRR installation, it is determined that benthic invertebrates in the area are not sensitive to the physical change to another seabed type (see paragraphs 22.7.297-299 **Volume 2**, **Chapter 22** of the **ES** [APP-317]).

3.9.133 Physical change to another seabed type resulting from the installation of desalination intake and outfall heads and any associated scour protection is predicted to have a negligible effect on benthic invertebrates. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) the effect is **not significant**.

Spread of non-indigenous species: Benthic ecology

Magnitude

3.9.134 The installation of the desalination intake and outfall heads and any associated scour protection would result in a change in seabed type from soft sediment (fine to medium sand) to a hard surface. The introduction of hard substrata to an area consisting primarily of soft sediments could facilitate the spread of invasive non-native species (INNS) that prefer hard habitats. The magnitude of impacts of the desalination infrastructure is anticipated to be the same as the assessment made within **Volume 2, Chapter 22** of the **ES** [APP-317]) for the FFR outfall heads. However, the duration would be shorter as the desalination headworks and associated scour protection would be removed during the construction phase of the project. Given the very small spatial area and medium duration, impact magnitude is very low.

Benthic invertebrate sensitivity

3.9.135 The introduction of hard substrata to an area consisting primarily of soft sediments could affect native benthic species by facilitating the spread of INNS that prefer hard habitats.

3.9.136 Benthic invertebrates were determined to have low sensitivity to the introduction of hard substrata due to FRR installation (see paragraph 22.7.303 **Volume 2**, **Chapter 22** of the **ES** [APP-317]). The same sensitivity also applies with respect to the installation of desalination infrastructure.

3.9.137 The spread of INNS resulting from the installation of desalination intake and outfall heads and any associated scour protection is predicted to have a negligible effect on benthic invertebrates. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]) the effect is **not significant**.

Loss of access to fishing areas: Commercial fishers and recreational boat anglers

Magnitude

3.9.138 During the installation of the offshore desalination infrastructure, hierarchical safety buffer zones of 250m to 500m depending on the activity and stage of installation would likely be applied surrounding construction vessels , (secured by Part B of the Code of Construction Practice; see Requirement 2 in the draft **Draft Development Consent Order** [REP6-006]). These safety buffer zones would be notified by means of Notice to Mariners (NtM), secured under Condition 13 of the Deemed Marine Licence with the **Draft Development Consent Order** [REP6-006]. The marine installation is anticipated to be short term and occur in the early construction phase. The whole desalination plant is anticipated to take 4-6 months to construct. Whilst in use, the desalination intakes and diffuser headworks would be demarcated with a temporary hazard buoy and NtM and would be removed during the construction phase after use.

3.9.139 Safety buffer zones and the physical presence of the infrastructure have the potential for implications for local fisheries interests. Any construction activities resulting in reduced access would be communicated in advance by means of the Fisheries Liaison and Co-existence Plan, secured under Condition 20 of the Deemed Marine Licence with the **Draft Development Consent Order** [REP6-006]

3.9.140 The magnitude of impacts associated with the installation and physical presence of the of the desalination infrastructure during the construction phase is anticipated to be the same as the assessment made within **Volume 2, Chapter 22** of the **ES** [APP-317] for loss of access to fishing areas due to the FRR and CDO headworks in similar locations.

3.9.141 During navigational baseline surveys in summer 2019, an average of three unique fishing vessels per day were recorded regularly off Sizewell.

One vessel was recorded regularly operating inshore of the Sizewell-Dunwich Bank, within the main development site boundary (**Figure 24.4, Volume 2 Chapter 24** of the **ES**) [APP-337]. Throughout the Winter survey period, there was an average of one unique fishing vessel every three to four days in the study area (**Volume 2 Chapter 24** of the **ES**) [APP-337].

3.9.142 A review of the commercial fishing off Sizewell and the wider area is provided in **Volume 2, Appendix 22F** of the **ES** [APP-323]. Shore-based observations suggest that most fishing near the proposed BLF is carried out by potting and trawling vessels. Trawling takes place to the northeast and southeast of the proposed development approximately 2nm offshore (refer to **Volume 2, Appendix 24A** of the **ES** [APP-338]).

3.9.143 MMO data suggest that one vessel, a beach-launched ≤10m netter and potter, operates from Sizewell beach (Ref.5), out to approximately 1nm (inside the Sizewell-Dunwich Bank). The desalination headworks would be installed close to the Unit 1 FRR outfall in soft sediment environments and unlikely to restrict potting activities, which are focussed off Thorpeness.

3.9.144 As the desalination plant represents a minor proportion of the fishing area for all fishing gear types, and safety buffer zones would be temporary the impact magnitude is assessed as low.

Sensitivity (Netters, Potters, Long-liners and Otter trawlers)

3.9.145 Changes in access to fishing areas associated with the installation of the desalination plant is anticipated to be the same as those assessed within **section 22.11c) i)** of **Volume 2, Chapter 22,** the **ES** [APP-317] for the FRR and CDO headworks.

3.9.146 Fishing activity near the proposed desalination infrastructure is considered to be light. In the worst-case of a 500m safety buffer zone during the installation of the heads, there is the potential for restricted access of the fisher to deploy nets within the Sizewell-Dunwich Bank. It is predicted that the area restricted by the desalination plant construction is a minor proportion of the available fishing area and does not restrict potting activities. Thereby allowing effort to be allocated to alternative areas.

3.9.147 Fishers are likely to have low sensitivity and would be managed by implementation of a Fisheries Liaison and Co-existence Plan, secured under Condition 20 of the Deemed Marine Licence with the **Draft Development Consent Order** (Doc Ref. 3.1(G).

3.9.148 The predicted effects are minor adverse. Therefore, consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant.**

Desalination water abstraction - Entrainment: Plankton and Benthic Ecology

Magnitude

3.9.149 The seawater intake would consist of a Passive Wedge-Wire Cylinder (PWWC) screen with a mesh size of approximately 2mm. The screen would be approximately 60cm in diameter and the headworks would be approximately 1.6m in length (**Section 3.2c)** of this chapter). The headworks would be positioned to reduce the tidal forcing against the screens and minimise approach velocities where possible.

3.9.150 The abstraction rate would vary depending on the water demand during the construction phase. At its peak the water demand would be 4Ml per day (4000m^3/d). The likely potable water demand profile for the construction period is summarised in **section 3.2 b) I** of this chapter. To achieve this volume of freshwater by Sea Water Reverse Osmosis (SWRO) 10Ml per day of seawater would be abstracted. The abstraction rate for the desalination plant is relatively low and equivalent to less than 0.09% of the proposed cooling water abstraction once operational and only occurs for a number of years during the construction phase. The volume of water abstracted in the open coastal system is very small relative to the tidal exchange. Assuming a conservative 10% daily tidal exchange rate, the maximum abstraction of 10Ml per day equates to approximately 0.03% of the tidal exchange in the Greater Sizewell Bay (of **Appendix 22H** of **Volume 2, Chapter 22,** the **ES** [APP-317]).

3.9.151 The impact magnitude is assessed as low.

Phytoplankton Sensitivity

3.9.152 At an individual level, phytoplankton have little resistance to primary entrainment and mortality of entrained individuals would occur. At the population level rapid generation rates and far higher water exchange compared to abstraction would result in losses being indiscernible. Sensitivity is precautionarily assessed as low. For context a full sensitivity assessment is provided in paragraphs 22.6.204-219 of **Volume 2, Chapter 22** of the **ES** [APP-317] for the larger impacts of entrainment in the operational cooling water system.

3.9.153 Entrainment is precautionarily assessed to have minor adverse effects on phytoplankton communities within the GSB. Therefore, consistent with the corresponding assessment for cooling water abstraction (**Volume 2,**

Chapter 22 of the **ES** [APP-317]), effects are **not significant** relative to high levels of natural variability.

Zooplankton Sensitivity

3.9.154 Entrained individuals would incur mortality, however, zooplankton have high rates of natural mortality and high fecundity. Most holoplanktonic species reproduce at a sufficient rate to negate significant entrainment losses (Ref. 6). Given the low volumes abstracted relative to high rates of tidal replenishment in an open coastal site, population level effects are predicted to be indiscernible at the scale of the GSB relative to natural variation. Zooplankton communities in the GSB are precautionarily assessed to have low sensitivity to entrainment by the desalination plant.

3.9.155 Entrainment is precautionarily predicted to have minor adverse effects on zooplankton communities within the GSB. Therefore, consistent with the corresponding assessment for cooling water abstraction (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant** relative to high levels of natural variability.

3.9.156 Seasonally abundant gelatinous species of zooplankton such as ctenophores have the potential to cause clogging of the PWWC intakes. To minimise the incidence of impingement of gelatinous zooplankton and other fouling material, the intakes would be oriented to reduce tidal forcing. Furthermore, the intake screens and pipework would be maintained by periodic cleaning using a compressed air cleaning system. The intake screen and pipework would be maintained with periodic chlorine dosing flow controlled at the intake head and angled inwards to prevent emissions to the environment. Abstracted water is dechlorinated prior to the SWRO membranes preventing release to the environment.

Sensitivity

3.9.157 The 2mm PWWC intakes would prevent larger bentho-pelagic species from being entrained in the desalination abstraction. Smaller bentho-pelagic species and pelagic larvae would be susceptible to entrainment. At the individual level, entrained taxa would incur mortality. The large population sizes and high tidal replenishment relative to abstraction rates mean losses are likely to be small at the population scale, and indiscernible above natural variation. Benthic ecology receptors are, therefore, assessed as having low sensitivity to the pressure at the population level.

3.9.158 Entrainment is predicted to have minor adverse effects benthic ecology. Therefore, consistent with the corresponding assessment for cooling water abstraction (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant** relative to high levels of natural variability.

Desalination water abstraction - Entrainment: Fish

Magnitude

3.9.159 The Eels (England and Wales) Regulations 2009 (the 'Eels Regulations') require for abstraction of more than 20m^3 per day to make provision for the safe passage of European eels (*Anguilla anguilla*). Such measures include eel screens. The design and orientation of the desalination intake heads is based on Environment Agency guidance (Ref. 7) and incorporates screening measures to protect eels in order to comply with the Eels Regulations. These measures would also afford protection to other fish species and invertebrates. An addendum to the Eels Regulations Compliance Assessment (**Appendix 22O** of **Volume 2, Chapter 22** of the **ES** [APP-332]) is submitted with the Change request for Proposed Change 19 (Doc Ref. 6.3 22O Ad 1 Ch).

3.9.160 The seawater intake would consist of a PWWC screen with a mesh size of approximately 2mm. The screen would be approximately 60cm in diameter and the headworks would be approximately 1.6m in length (**Section 3.2c)** of this chapter). The headworks would be positioned to reduce the tidal forcing against the screens and minimise approach velocities where possible.

3.9.161 The abstraction rate would vary depending on the water demand during the construction phase. At its peak the water demand would be 4Ml per day (4000m^3/d). The likely potable water demand profile for the construction period is summarised in **section 3.2 b) I** of this chapter**.** To achieve this volume of freshwater by Sea Water Reverse Osmosis (SWRO) 10Ml per day (10,000m^3/d) of seawater would be abstracted. The abstraction rate for the desalination plant is relatively low and equivalent to less than 0.09% of the proposed cooling water abstraction once operational and will only occur for a number of years during the construction phase.

3.9.162 The impact magnitude is assessed as low.

Sensitivity

3.9.163 As part of the programme of work to determine entrainment losses from the cooling water, abstraction fish and invertebrate samples from the Sizewell B (SZB) forebay were taken on 40 occasions between May 2010 and May 2011. Entrainment sampling at SZB identified and enumerated eggs, larvae and juveniles for the species where these life-history stages are present at Sizewell. **Table 3.11** (from **Section 22.8d)iii)** within **Volume 2, Chapter 22** of the **ES** [APP-317]) shows the key fish taxa potentially susceptible to entrainment.

3.9.164 The same species are considered to be relevant to the desalination abstraction, however a finer 2mm mesh will be applied to the desalination intake rather than a 10mm screen for the cooling water intake. As such, juvenile life stages with the exception of gobies would have very limited entrainment risk. It should also be recognised that the mesh for the desalination abstraction is at the headworks meaning biota which are not entrained are not drawn into the system at all.

Table 3.11: Summary of key taxa identified in entrainment sampling.

Species	Egg stage present.	Larvae stage present.	Juvenile stage present.
European sea bass	✓	×	×
Gobies	×	✓	✓
Dover sole	✓	✓	×
Dab	×	×	✓
European flounder	×	✓	×
Anchovy	✓	×	×
European sprat	✓	✓	✓
Atlantic herring	×	✓	✓

3.9.165 The European eel (*Anguilla anguilla*) is catadromous, migrating as glass eels from the marine environment into estuaries and freshwater to feed and grow as yellow eels, then migrating back to sea as silver eels, ultimately to spawn in the Sargasso Sea. The glass eel phase of the eel lifecycle is potentially at risk from unmitigated entrainment, however, the fine 2mm mesh employed at the desalination intake is specifically designed to prevent entrainment of glass eels and so provides the necessary mitigation (Ref. 7). **Volume 2, Appendix 22G** of the **ES** [APP-324] describes other fish species of conservation interest in the vicinity of the Suffolk coast which may be vulnerable to entrainment losses. The 0 group of twaite shad, allis shad and sea trout are not at risk of entrainment as that part of their lifecycle is not present in the coastal waters off Sizewell. River lamprey (*Lampetra fluviatilis*) occur at Sizewell but the 2mm mesh would preclude even the smallest individuals in marine waters being entrained. The sensitivity of fish species of conservation interest to abstraction effects from the desalination intake is assessed as not sensitive.

3.9.166 The larval stages of the fish key taxa; Dover sole, flounder, herring, sprat and gobies may be entrained by the desalination water abstraction along with the eggs of Dover sole, sprat, anchovy and sea bass (**Table 3.11**). Natural mortality of these early life history stages is very high. Losses of Dover sole, flounder, herring, sprat, sea bass and anchovy, were assessed for the far greater impact of entrainment by the main cooling water flow and were deemed to be not sensitive at the population level (**Section 22.8d)iii)** within **Volume 2, Chapter 22** of the **ES** [APP-317]) as effects were predicted to be orders of magnitude below the 1% SSB threshold. The only exception was sand goby which was assessed as having low sensitivity to entrainment in the main cooling water. In the case of gobies, the smaller mesh size employed at the desalination intake would minimise adult and juvenile entrainment. The low abstraction rate of the desalination plant, less than 0.09% of the main cooling water abstraction during peak freshwater demand during the construction phase, and no overlap with the main cooling water flows would mean losses of larvae would be indiscernible relative to high rates of natural mortality. Therefore, the key fish taxa are regarded as not sensitive to entrainment effects from the desalination at the population level.

3.9.167 Entrainment is predicted to have negligible effects on fish populations. Therefore, consistent with the corresponding assessment for cooling water abstraction (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant** relative to high levels of natural variability.

Localised Depletion:

3.9.168 In addition to the population level effects, assessments consider the potential for the desalination plant to cause localised depletion in fish numbers at the scale of the Sizewell Bay. An assessment of localised depletion on larval and juvenile fish at the scale of the GSB has been provided assessing the combine abstraction of Sizewell B and Sizewell C (**Volume 3, Appendix 2.17A** of the **ES Addendum** [REP6-016]) to assess the potential for food-web effects mediated through local reductions in prey availability.

3.9.169 During the breeding season, little terns feed their chicks on a range of prey items including fish and crustaceans and young-of-the-year clupeids have been shown to be important prey resources for little terns regionally (Ref. 8).

3.9.170 The prey items for young chicks can be as small as 25mm (Ref. 8). The 2mm PWWC mesh size would minimise losses of larvae in the size range available to little tern. Furthermore, the very small abstraction rates relative to tidal exchange in the open coastal environment would result in negligible losses in the availability of prey resources for to designated

birds. Therefore, consistent with the corresponding assessment for cooling water abstraction (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects of localised depletion are **not significant**.

Desalination water discharge - Increases in salinity: All Receptors

Magnitude

3.9.171 During use the desalination plant would abstract seawater and potable water would be produced using Sea Water Reverse Osmosis (SWRO). Desalination plants typically convert 40% of the abstracted water into freshwater. Discharges would be released as a controlled brine. The high salinity discharge would be denser than the seawater and would tend to sink to the seabed. The use of a diffuser head would facilitate rapid mixing and direct the discharge off the seabed. As detailed in **Appendix 3A** of this **ES addendum** the discharge plume modelling results indicate that excess salinity would fall to within 1 PSU above background within approximately 6 to 10m of the discharge.

3.9.172 Salinity at Sizewell follows an annual trend with lowest values observed in Winter months. The mean annual salinity is 33.3 PSU whilst the 5th percentile Winter salinity is 31.7 PSU (see **Section 21.4B.ii** of **Volume 2**, **Chapter 21** of the **ES** [APP-315]).

3.9.173 While the duration of the salinity plume arising from the desalination plant is potentially several years, there will be a very small area which is exposed to salinities greater than 1 PSU above ambient, therefore the impact magnitude is considered to be low.

Phytoplankton Sensitivity

3.9.174 Some plankton would drift through the saline discharge plume, and residence time within the plume would depend upon several factors, most notably discharge flow and drift speed (Ref. 9). A study looking at the effects of a SWRO concentrate discharges, showed that phytoplankton biomass did not significantly change and the discharge did not cause algal blooms (Ref. 10).

3.9.175 Reflective of the very low magnitude and small proportions of plankton potentially exposed, the sensitivity is assessed as not sensitive.

3.9.176 The impact of increases in salinity resulting from the saline discharge during the operation of the desalination plant is predicted to have a negligible effect on phytoplankton. Effects are **not significant**.

Zooplankton Sensitivity

3.9.177 The response to increases in salinity by zooplankton vary by species and life stage (Ref. 11). Mortality in adult zooplankton does not usually occur up to about 40% above ambient salinity (Ref. 12,13, 14). However, earlier life stages can show effects with a salinity increase of about 20% above ambient (Ref. 15, 16, 17).

3.9.178 Reflecting salinities of 1 PSU occurring within 6 to 10m, and the small proportions of plankton potentially exposed, the sensitivity is not sensitive.

3.9.179 The impact of increases in salinity resulting from the saline discharge during the operation of the desalination plant is predicted to have a negligible effect on zooplankton. Effects are **not significant**.

Benthic invertebrate sensitivity

3.9.180 As salinity change in excess of 1 PSU would be restricted to within only 10m of the discharge point, exposure to salinity changes would be extremely small for all benthic invertebrate populations. Moreover, a study of macroinvertebrate communities located inside a 10m saline plume of a desalination plant found that they were not significantly different from communities at control sites with ambient salinity (Ref. 18). This suggests that, even within the very small plume footprint, it is unlikely that benthic invertebrate communities would be significantly affected by the saline discharge from the desalination plant. Benthic invertebrates are therefore not sensitive to this pressure.

3.9.181 Increases in salinity resulting from saline discharge from the desalination plant is predicted to have a negligible effect on benthic invertebrates. The effect is **not significant**.

Marine Fish, Migratory Fish and Eggs/Cases and Larvae Sensitivity

3.9.182 There are currently no published studies reporting investigations related to brine-effluent from desalination plants effects upon eggs and larvae (Ref. 11). Eggs and larvae are likely to have good resilience to small changes in salinity, though increases of ~50% or higher than ambient can cause significant and acute mortality after up to 48 hours of exposure (Ref. 11). Larval survival rate is lowered by increasing salinity to 5-15% above ambient, but the impacts have previously been found not to be significant (Ref. 19, 20, 21). Exposure of eggs and larvae will be limited and unlikely to have a quantifiable impact.

3.9.183 High salinity plumes discharged from desalination plants can produce toxic effects on marine fish as observed in the Canary Islands for lizardfish (*Synodus*) and other soft-bottom fish such as greater weever (*Trachinus draco*) and the wide-eyed flounder (*Bothus podas*) the sole *Microchirus azevia* (Ref. 23). Though this was caused by the lowered

physico-chemical variable values (pH and oxygen saturation) due to the addition of cleaning treatment chemicals. The installation of diffusers at the same plant significantly reduced the salinity of discharges and these will be employed at Sizewell C. Fish abundance and diversity have been observed to increase in areas of brine discharge (Ref. 22, 24) or show no reduction in species richness or abundance (Ref. 25) and long term monitoring of brine discharges from desalination plants has had no apparent effect on biological communities likely as a result of rapid dilution of effluent (Ref. 22, 24). Adult and juvenile fish are also mobile and able to exhibit a level of avoidance to increases in salinity.

3.9.184 The sensitivity of fish to the small-scale localised salinity discharges associated with the desalination outfall is not sensitive.

3.9.185 The impact of increases in salinity resulting from saline discharge associated with the operation of the desalination plant is predicted to have negligible effects on eggs/case, larvae, marine and migratory fish. Effects are therefore **not significant**.

Localised Displacement

3.9.186 Changes in salinity associated with the operation of the desalination plant are not predicted to affect the distribution of fish within the GSB. No indirect food web effects or changes in the availability of fish as prey items for designated features or as fisheries resources are expected. Fish are not sensitive to displacement resulting from localised increases in salinity. Effects from saline discharge are predicted to be negligible and **not significant**.

Marine Mammal Sensitivity

3.9.187 Marine mammals are likely to exhibit a level of avoidance to increases in salinity as they are large, highly mobile species that are able to avoid disturbance (Ref. 26). Marine mammals have an osmoregulatory capacity and can detect changes in the external flow field to avoid contact with the turbulent high-velocity zone near the diffuser nozzles (Ref.9, 27). A review of the effects of desalination plant brine upon cetaceans concluded there is currently no information to suggest brine discharge will have a negative effect on cetacean health (Ref. 26, 27, 28).

3.9.188 Marine mammals are not sensitive to increases in salinity.

3.9.189 The impact of increases in salinity resulting from the saline discharge associated with the operation of the desalination plant is predicted to have a negligible effect on marine mammals. Effects are therefore **not significant**.

Desalination water discharge - Heavy metal contamination: All Receptors

Magnitude

3.9.190 During use, the desalination plant would abstract seawater and potable water would be produced using Sea Water Reverse Osmosis (SWRO). Desalination plants typically convert 40% of the abstracted water into freshwater. Discharges would be released as a controlled brine. Approximately 90-99% of the loading of most of the substances in the 40% of water retained for potable supply would be discharged back to the sea as a brine concentrate. The heavy metals in the brine would be 1.6 times more concentrated than the metals and trace elements in the discharge relative to those in seawater. The discharge would be at ambient temperature.

3.9.191 As detailed in **Appendix 3A** of this **ES addendum** three metals; zinc, chromium and lead are predicted to be in excess of EQS or applied thresholds as a result of the desalination discharge. Notably background levels of lead and zinc measured in the GSB are above their respective EQS levels and therefore an assessment is made relative to background levels.

3.9.192 Modelling of the worst-case discharge plume, using the maximum 10Ml per day (6Ml per day discharge) scenario, (**Appendix 3A** of this **ES addendum)** indicates the maximum area, calculated based on the tidal ellipse, above EQS (or detectable above background concentrations) for zinc is 0.03ha, for chromium is 0.08ha, and for lead is 0.02ha. Based on the assumption that the maximum plume extent is 38.5m (for chromium) represents the radius of a circle around the discharge point, the maximum bounding area affected by substances in the desalination discharge would be precautionarily estimated as <0.5ha. The spatial area affected would be persistent for the duration of the desalination plant use.

3.9.193 Lead was not assessed in the original ES as no discharges exceeded background levels of 2.07µg/l in the GSB (**Appendix 3A** of this **ES addendum)**. The maximum concentration in the desalination discharge would be approximately 1.6-fold ambient at source. Excess lead levels are expected to be undetectable relative to background within a maximum range of 20.0m from the discharge point, with an estimated peak area of exceedance of 0.02ha.

3.9.194 While the duration of the discharge is potentially several years, taking into account the very small spatial area of exposure, the impact magnitude is considered to be low.

Plankton Sensitivity

3.9.195 A very small proportion of the plankton community within the Greater Sizewell Bay would be exposed to heavy metal concentrations in exceedance of EQS thresholds or natural background concentrations. In the tidally dominated system exposure would be limited. No discernible changes in plankton communities are predicted. Plankton within the GSB are not sensitive to heavy metal discharges from the diffusers of the desalination plant.

3.9.196 Heavy metal discharges from the desalination plant are predicted to have negligible effects on plankton receptors. Therefore, consistent with the corresponding assessment for the CDO discharge (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant**.

Benthic invertebrate sensitivity

3.9.197 Exposure to moderate concentrations of heavy metals can produce a variety of non-lethal effects on benthic organisms, such as morphological changes, growth inhibition, behaviour changes or alterations to reproduction. Benthic invertebrates were determined to be not sensitive to discharges of heavy metals (chromium and zinc) from the CDO, primarily because of the highly restricted spatial extent of the plume and, thus, the very limited exposure to the pressure at the population level (see paragraphs 22.7.162-163 **Volume 2, Chapter 22** of the **ES** [APP-317]).

3.9.198 Though benthic invertebrates would be exposed to excess levels of lead as well as chromium and zinc due to discharges from the desalination plant, they remain not sensitive to this pressure due to the very limited exposure at the population level.

3.9.199 Heavy metal discharges from the desalination plant are predicted to have a negligible effect on benthic invertebrates. Therefore, consistent with the corresponding assessment for the CDO discharge (**Volume 2, Chapter 22** of the **ES** [APP-317]), the effect is **not significant**.

Marine Fish Sensitivity

3.9.200 As detailed in **section 22.8c)iii)** of **Volume 2, Chapter 22,** the **ES** [APP-317] the sensitivity of marine fish to zinc and chromium contamination is predicted to be not sensitive. While the duration of the desalination discharge is expected to be longer that the dewatering discharges assessed in the ES, the sensitivity assessment remains unchanged due to the small spatial area of the desalination plume and mobile nature of the fish receptors meaning exposure would be limited.

3.9.201 In experimental trials (Ref. 29) killifish (*Fundulus heteroclitus*) exposed to lead for 96 hours had a derived median lethal concentration (LC_{50}) of greater than 100mg/l, while sub-lethal responses have been detected

between 1 and 10 mg/l. For grey mullet (*Chelon labrosus*) the LC_{50} for lead was likely to be greater than 4.5mg/l. Fish would be exposed to a very small spatial areas of only moderately elevated lead concentrations (1.6-fold ambient). Fish are mobile and would transit through the area resulting in short term and temporary exposure. The sensitivity of marine fish to excess lead in desalination discharges is predicted to be not sensitive.

3.9.202 The impact of chromium, lead and zinc exposure resulting from construction discharges, is predicted to have a negligible effect on marine fish. Therefore, consistent with the corresponding assessment for the CDO discharge (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant** at the sea area and regional stock/population levels

Migratory Fish Sensitivity

3.9.203 The sensitivity of migratory fish adults and juveniles to heavy metal contamination is predicted to be not sensitive, based on the limited spatial area of the impact and low concentrations relative to baseline conditions.

3.9.204 The impact of chromium, lead and zinc contamination resulting from discharges from the desalination diffuser heads, is predicted to have a negligible effect on migratory fish. Therefore, consistent with the corresponding assessment for the CDO discharge (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant**.

Localised Displacement

3.9.205 Any displacement behaviour due to discharges of heavy metals is predicted to be highly localised and exposure would represent a negligibly small proportion of fish in the GSB. Fish are not sensitive to this pressure. Heavy metal contamination is predicted to have a negligible effect on fish displacement. Therefore, consistent with the corresponding assessment for the CDO discharge (**Volume 2, Chapter 22** of the **ES** [APP-317]) **no significant** changes in the availability as prey items for designated features and as fisheries resources are predicted.

Marine Mammal Sensitivity

3.9.206 As detailed in paragraphs 22.9.124-127 of **Volume 2, Chapter 22,** the **ES** [APP-317] in relation to dewatering discharges from the CDO, the sensitivity of marine mammals to heavy metal contamination is predicted to be not sensitive. The additional consideration of lead discharges above the EQS and background levels during the desalination plant usage does not change this assessment.

3.9.207 The limited spatial extent of zinc, lead and chromium discharges in the inshore waters mean the probability of exposure is minimal, especially as that uptake is only possible indirectly through the consumption of prey. In fish, the direct uptake of heavy metals occurs through the gills, and there is a potential for indirect effects through food webs. However, the fish assessment predicts negligible effects of chromium, lead and zinc exposure on fish species due to minimal spatial exposure. No significant indirect effects through their prey are expected in marine mammals.

3.9.208 Marine mammal populations are predicted to be not sensitive to heavy-metal discharges. The impact of heavy-metal contamination resulting from construction discharges associated with the desalination plant is predicted to have a negligible effect on marine mammals. Therefore, consistent with the corresponding assessment for the CDO discharge (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant**.

Desalination water discharge - Nutrient enrichment: Plankton

Magnitude

3.9.209 Approximately 60% of the abstracted seawater would be discharged back into the sea as a concentrated brine following SWRO. Conditioning chemicals associated with the SWRO membrane would not be discharged to the marine environment, however, increased concentrations of phosphorous derived from a membrane descaling chemical would be discharged.

3.9.210 An assessment of the increase in phosphate has been completed in **Appendix 3A** of this **ES addendum**. The additional nutrient loading during the construction period of the desalination plant is predicted to result in a 0.17% increase in annual production in Sizewell Bay relative to the current baseline situation. Combined with other construction nutrient discharges the combined effect is expected to be an increase in annual phytoplankton production of 0.39% With reference to **Volume 2, Chapter 22, Appendix 22H** of the **ES** [APP-317], a 0.39% increase in annual production would not be detectable against a natural background or inter-annual variation in production with Sizewell Bay. The magnitude of impact is low.

Sensitivity

3.9.211 Nutrient discharges have the potential to enhance phytoplankton biomass particularly if they occur during periods of nutrient limitation. However, poor light penetration due to turbid conditions means the coupling between nutrient inputs and eutrophication are weakened in the southern North Sea. **Volume 2, Chapter 22** of the **ES** [APP-317] assessed construction nutrient additions and determined the Greater Sizewell Bay

system is rarely phosphate limited. Therefore, small increases in phosphates are unlikely to increase the assessment of effects presented in **Volume 2, Chapter 22** of the **ES** [APP-317]. Phytoplankton biomass within the GSB is not sensitive to phosphate discharges associated with the desalination plant. A full sensitivity assessment is provided in paragraphs 22.6.110-115 of **Volume 2, Chapter 22**, of the **ES** [APP-317].

3.9.212 Nutrient inputs are predicted to have negligible effects on phytoplankton biomass. Therefore, consistent with the corresponding assessment for construction nutrient additions (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant** relative to natural variability in phytoplankton biomass.

3.9.213 Increases in primary production at the base of coastal food webs has the potential to cause bottom-up effects. However, negligible changes in gross primary productivity are predicted, therefore no indirect food web effects are predicted.

Abrasion / Physical Disturbance – Benthic Ecology

Magnitude

3.9.214 Activities associated with removal of the intakes (e.g. the use of jack-up barges and anchoring) have the potential to cause localised surface and sub-surface abrasion from the physical presence of the jack-up legs and anchors on the seabed. The magnitude of impact is assessed as very low given the short duration and limited spatial extent relative to the available soft sediment within the GSB.

Sensitivity

3.9.215 The presence of a jack-up barge during the removal of the headworks would affect soft sediment habitats. While benthic invertebrates would be expected to have no resistance to the pressure the impact would be constrained to a very small area around the jack-up legs and anchor lines. As detailed in paragraph 22.7.459 of **Volume 2, Chapter 22**, of the **ES** [APP-317] rapid recovery would be expected. Soft sediment benthic receptors are not sensitive to this pressure. Therefore, impacts are predicted to be negligible and consistent with the corresponding assessment for FRR installation (**Volume 2, Chapter 22** of the **ES** [APP-317]), effects are **not significant**.

3.10 Marine Historic Environment

a) Introduction

3.10.1 This section provides an addendum to the Marine Historic Environment assessment resulting from the Proposed Change 19, with reference to the following documents:

- **Volume 2, Chapter 23** of the **ES** [APP-334]; and
- **Volume 1, Chapter 2** of the **First ES Addendum** [AS-181].

b) Updated assessment

3.10.2 The proposed change does not change the existing and future baseline for the marine historic environment as described in **Volume 2, Chapter 23** of the **ES** [APP-334].

3.10.3 The assessment of the likely geomorphological impacts from the proposed intake and outfall structures of the desalination plant (see **section 3.7** Coastal geomorphology and hydrodynamics) suggests that effects, such as scour, will be negligible and not significant.

3.10.4 No adverse effects to known wreck sites, as identified within **Volume 2**, **Chapter 23** of the **ES** [APP-334], are expected from the proposed change to the Sizewell C Project. All known wrecks sites are located beyond the area of predicted impact from the proposed change.

3.10.5 The proposed additional activities would not alter the assessment, or its conclusions, presented in **Volume 2, Chapter 23** of the **ES** [APP-334]. The mitigation measures proposed for the marine historic environment in the ES, consisting of a finds reporting protocol and geoarchaeological and palaeoenvironmental analysis and academic dissemination, remain unchanged.

3.11 Marine Navigation

a) Introduction

3.11.1 This section provides an addendum to the marine navigation assessment resulting from the Proposed Change 19, with reference to the following documents:

- **Volume 2, Chapter 24** of the **ES** [APP-337]; and
- **Volume 1, Chapter 2** of the **First ES Addendum** [AS-181].

b) Updated assessment

i. Baseline

3.11.2 The proposed changes do not change the existing or future baseline for marine navigation as described in **Volume 2, Chapter 24** of the **ES** [APP-337].

ii. Environmental Design and Mitigation

3.11.3 The mitigation measures set out within **Volume 2, Chapter 24** of the **ES** ([APP-337] include circulation of information in advance of and during the construction works, marking of intake/outfall structures with buoys or beacons, Fisheries Liaison Officer and establishment of a Competent Harbour Authority, who will have appropriate marine procedures and safety management systems, and will establish temporary safety zones, potentially monitored by guard vessels, around sensitive areas of construction to safely manage navigation. It is also assumed that a buoyed construction zone will be created around the construction works for the intake/outfall structures, as described in the Part B of the **Code of Construction Practice** (Doc Ref. 8.1(D)) (secured by Requirement 2 in the **draft DCO** (Doc Ref. 3.1(G))).

iii. Assessment of effects

3.11.4 The presence of vessels associated with the construction of the intake and outfall headworks for the desalination plant leads to an increased collision risk for passing traffic and vessels actively engaged in fishing activities. There is also an increased collision risk associated with dredging activity required for the desalination plant intake/outfall headworks. Due to the shallow waters in which the intakes and outfalls will be located (approximately 5.1m and 4.2m relative to Lowest Astronomical Tide), only small vessels (e.g. recreational and fishing vessels) are expected to pass close to the proposed locations for the intakes and outfalls. The proposed locations lie within the Competent Harbour Authority area. The Competent Harbour Authority will deploy temporary safety zones, potentially monitored by guard vessels, around sensitive areas of construction to safely manage navigation. In addition, it is expected that the intakes and outfalls will be located within a buoyed construction zone. Based on this, there is not expected to be any change to the existing assessment. The frequency of this impact is expected to remain extremely unlikely and the severity moderate, resulting in an overall risk ranking of tolerable (**not significant**).

3.11.5 The presence of vessels associated with the construction of the desalination intakes and outfalls may cause increased disruption to local

fishermen and recreational users. This will be further increased by any areas that are protected by temporary safety zones or within a buoyed construction area. One fishing vessel was noted to operate regularly close to the proposed locations of the intakes and outfalls, and recreational craft were observed approximately 0.3nm from the proposed locations. Promulgation of information via Notices to Mariners and consultation with local fisheries through a Fisheries Liaison Officer as part of a Fisheries Liaison and Coexistence Plan (secured by Marine Licence Conditions 13 and 20 (Doc Ref. 3.1(G))) would help reduce this disruption. Considering the additional construction works for the desalination intakes and outfalls along with the construction works assessed in the ES, the frequency of this effect is considered to remain reasonably probable, and the severity minor, resulting in a risk ranking of tolerable (**not significant**).

3.11.6 Once the intake and outfall structures have been installed, there may be an increased risk of passing vessels grounding on the structures due to the shallow water depths and reduced under keel clearance. Due to the proposed location of the structures in shallow waters, this is expected to impact smaller vessels (e.g. fishing and recreational craft) or vessels involved in construction works for the marine aspects of the Sizewell C Project. The minimal clearance of the intake and outfall structures could be 1.2m relative to Lowest Astronomical Tide. However, the structures will be located within the Competent Harbour Authority area, within a buoyed construction zone, and temporary safety zones will be deployed around sensitive areas of construction to safely manage navigation, thereby minimising the risk of vessels grounding. The frequency of this effect is therefore considered to be extremely unlikely and the severity moderate resulting in a ranking of tolerable (**not significant**).

3.11.7 The protrusion of the intake and outfall structures above the seabed could present a snagging risk from fishing vessels carrying demersal gear. A snagging incident could cause damage to the structures or to the fishing gear and, in the worst case, could lead to instability or capsize of the fishing vessel. No vessels were observed actively fishing using demersal gears in close proximity to the intake / outfall structures, which will be located within the Competent Harbour Authority area, within a buoyed construction zone. The frequency of this impact is therefore considered to be extremely unlikely and the severity serious, results in an overall ranking of tolerable (**not significant**).

3.11.8 Similarly, any risk to the intake and outfall structures from a vessel dragging anchor onto them or anchoring in an emergency onto them will be mitigated by the buoyed construction zone and temporary safety zones, as required. The frequency of this impact is therefore considered

to be extremely unlikely and the severity serious resulting in a ranking of tolerable (**not significant**).

3.12 Major accidents and disasters

a) Introduction

3.12.1 This section provides an addendum to the major accident and disasters (MA&D) assessment resulting from the Proposed Change 19, with reference to the following documents:

- **Volume 2, Chapter 27** of the **ES** [APP-344]; and
- **Volume 1, Chapter 2** of the **First ES Addendum** [AS-181].

b) Updated assessment

i. Baseline

3.12.2 The introduction of Proposed Change 19 would not alter the baseline described within **Section 27.4** of **Volume 2, Chapter 27** of the **ES** [APP-344] and updated in **Section 2.22** of **Chapter 2** of the **First ES Addendum** [AS-181].

ii. Environmental Design and Management

3.12.3 The tertiary mitigation identified the documents listed within 27.5.15 of **Volume 2, Chapter 27** of the **ES** [APP-344], such as the **Code of Construction Practice** (**CoCP)** (Doc Ref. 8.11(D)) (secured by Requirement 2 of the **draft DCO** (Doc Ref. 3.1(G))) would be applicable to the construction of Proposed Change 19. In addition, paragraphs 27.5.17 to 27.5.19 establish the health and safety requirements for the construction works, which include the preparation of a safe system of work.

3.12.4 As noted within **Section 3.2,** a temporary hazard marker would be located directly above the intake and outfall pipe, therefore mitigation measures described in paragraph 3.11.3 of this chapter for Marine Navigation are also relevant to this assessment.

iii. Assessment of Effects

3.12.5 The Proposed Change 19 would be temporary and only required to facilitate the construction of the Sizewell C Project. On this basis, and in accordance with the methodology set out within **Volume 1**, **Appendix 6X** of the **ES** [APP-171], the construction and operation of the desalination

plant is considered within the construction assessment only. This assessment scenario is described in paragraph 1.3.11 [APP-171] which has been replicated below:

"Construction at the main development site, including operation and removal and reinstatement of temporary development at the later stages of construction"

Construction

3.12.6 The Proposed Change 19 would not change the assessment of vulnerability of the proposed development to natural disasters or from off-site sources during construction. Therefore, risk IDs C1 to C12 and C32 to C52 remain as described in the updated Environmental Risk Record presented in **Volume 3, Appendix 3.B** of this **Fourth ES Addendum**.

3.12.7 As part of the MA&D assessment, consideration is given to new MA&D hazard or threat sources that are introduced as a result of the construction of the Sizewell C Project. Whilst it is acknowledged that the Proposed Change 19 would introduce additional construction activities within both the terrestrial and marine environment, for the majority of hazards, the vulnerability of the construction of the proposed development to major accidents from on-site sources and the potential major accidents resulting from the construction of Proposed Change 19 would be mitigated by existing mitigation. Therefore, the MA&D assessment conclusions would not change.

3.12.8 Proposed Change 19 has been identified to have potential to introduce new risk events under the existing hazard C26 Marine Navigation Risks, identified within **Volume 2, Chapter 27** of the **ES** [APP-344] and the supporting Environmental Risk Record [APP-345].

3.12.9 An assessment of the marine navigation risks is presented in **Section 3.11 b)** of this chapter. In summary, all marine navigation risks introduced by the Proposed Change 19 are assessed as tolerable (**not significant**).

iv. Additional Mitigation and Residual Effects

3.12.10 This assessment has identified that the Proposed Change 19 would not require any additional mitigation nor change the residual MA&D effects described in **Volume 2, Chapter 27** of the **ES** [APP-344]. An updated Environmental Risk Record (**Volume 3, Appendix 3.B** of this **Fourth ES Addendum**) has been prepared to reflect the addition of Proposed Change 19.

3.13 Project-wide, Cumulative and Transboundary Effects

a) Introduction

3.13.1 In terms of the assessments presented within **Volume 10** of the **ES** [APP-572 to APP-580], as updated by the subsequent **ES Addenda** [AS-189, REP6-017], there is no change to the cumulative assessments for terrestrial environment topics and the transboundary effects assessments as a result of Proposed Change 19. This is because:

- There is no change to the conclusions of the terrestrial environmental assessments as a result of Proposed Change 19, which could give rise to new or different significant inter-relationship, project-wide effects or cumulative effects with other non-Sizewell C developments.
- The effects of the Proposed Change 19, as described within **sections 3.4 to 3.12** of this chapter, would not extend beyond the UK borders and therefore, no transboundary effects would occur as a result of Proposed Change 19.

3.13.2 The remainder of this section presents an update of the cumulative effects assessments for the marine environment topics.

b) Updated cumulative effects assessment

i. Coastal Geomorphology and Hydrodynamics

3.13.3 The cumulative Coastal Geomorphology assessment in **Volume 10, Chapter 4** of the **ES** [APP-578] identified a low risk that all elements of the development lead to measurable in-combination and cumulative impacts on coastal geomorphology beyond those assessed separately. Nevertheless**,** long-term monitoring of each feature is proposed in the **CPMMP** [REP5-059] which will be implemented before the temporary desalination plant intake and outfall works will be constructed.

3.13.4 The location of the outfall will not interact with the FRR1 head at (essentially) the same location, as the desalination plant will be removed before the FRR is constructed. The intake head, 100m further seaward than the outfall and the outer longshore bar, is not aligned with any other structures and the scour pits of the heads do not interact with the impacts of other structures. Hence the modelling in BEEMS Technical Report TR543 “Modelling of the Temporary and Permanent Beach Landing Facilities at Sizewell C” [PDB-010] which demonstrated no interaction remains an appropriate conclusion.

3.13.5 The additional (individually negligible) impacts of the desalination works do not affect the potential for in-combination or cumulative impacts, hence the original assessment presented in **Volume 10, Chapter 4** of the **ES** [APP-578] is considered to still be appropriate and the measures in the CPMMP sufficient to capture and remedy any potential effects.

ii. Marine Ecology and Water Quality and Sediments

3.13.6 The cumulative Marine Ecology and Water Quality assessment was provided in **Volume 10, Chapter 4** of the **ES** [APP-578]. The addition of the desalination plant does not add any novel pressures to be considered in a cumulative framework with the exception of increase in salinity and lead contamination, which are highly localised <0.5ha as a worst-case. **Volume 10, Chapter 4** of the **ES** [APP-578] identified no other developments which would discharge within the cumulative effects zone of influence and therefore saline and lead discharges do not have the potential to change the cumulative effects assessment.

3.13.7 The additional impacts of the desalination works are individually assessed as negligible or minor adverse, and **not significant**, and do not affect the potential for cumulative impacts with other developments. Dredging for the desalination plant will not interact with other project activities such as dredging for the FRR heads or CDO. However, it is feasible that dredging activities could coincide with maintenance dredging for the enhanced permanent BLF. In such an incidence suspended sediment and sedimentation rate changes may increase. The impact of combined dredge plumes for the BLF maintenance and dredging for the FRR was empirically modelled in **Volume 2, Chapter 22, Appendix 22J** [APP-327]. It was concluded that the inter-relationship effect due to the temporal coincidence of the dredge activities would not result in changes in the original assessment. Effects were **not significant** (**Volume 2, Chapter 22** of the **ES** [APP-317]). This conclusion remains the same should dredging for the desalination headworks coincide with maintenance dredging for the BLF. Likewise, abstraction for the desalination plant will cease before cooling water abstraction begins (both before commissioning and operational abstraction). Therefore, the original assessment is considered to remain valid.

iii. Marine Historic Environment

3.13.8 As set out within **Volume 10, Chapter 4** of the **ES** [APP-578], the assessment of the marine historic environment is focused upon the proposed infrastructure and the potential impact upon historic environment assets within the site boundary. The activities identified within the wider cumulative effects assessment are not identified as

having additive or interactive environmental effects upon the marine historic environment within the site boundary which would surpass / enhance those from the proposed development. Therefore, there is no potential for the additional construction works associated with the desalination plant to introduce new cumulative effects with regard to the marine historic environment.

iv. Marine Navigation

3.13.9 The additional construction works associated with the desalination plant could lead to a slight increase in the cumulative navigational risk, but the overall effect is expected to remain tolerable (not significant) for each impact considered in the marine navigation assessment.

v. Major Accidents and Disasters

3.13.10 Beyond the slight increase in the cumulative navigational risk for each impact considered in the marine navigation assessment, which would remain tolerable (not significant), there are no further changes to the cumulative effects assessment presented in **Volume 10**, **Chapter 4** of the **ES** [APP-578] as updated by **Chapter 2** of this **Fourth ES Addendum**.

3.14 Conclusion

3.14.1 In conclusion, there are no new or materially different significant effects as a result of the Proposed Change 19. Whilst the provision of the desalination plant will introduce new effects within the marine environment, each of these effects has been assessed as not significant, with appropriate mitigation in place. A summary of the mitigation proposed for the Proposed Change 19 is provided within the **Mitigation Route Map Third Addendum** (Doc Ref. 8.12 (D) Ad 3 Ch).

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